



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
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IN REPLY REFER TO:
1792(116)
Indian Soda
A3822(WHY:cn)

JUL 16 2007

Dear Interested Public:

The enclosed *Environmental Assessment* (EA) for the Indian Soda Project is being advertised in the Medford Mail Tribune for a 30 day public review period.

The primary purpose of a public review is to provide the public with an opportunity to comment on the Bureau of Land Management's (BLM) determination that there are no significant impacts associated with the proposed action and, therefore, an environmental impact statement is not necessary.

We welcome your comments on the content of this document. We are particularly interested in comments that address one or more of the following: (1) new information that would affect the analysis; (2) possible improvements in the analysis; and (3) suggestions for improving or clarifying the proposed management direction. Specific comments are the most useful. Comments, including names and addresses, will be available for public review. Individual respondents may request confidentiality. If you wish to withhold your name and/or address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety. This EA is published on the Medford District web site, www.or.blm.gov/Medford/, under "Planning Documents."

All comments should be made in writing and mailed to Lorie List or Bill Yocum, Ashland Resource Area, 3040 Biddle Road, Medford, OR 97504. Any questions should be directed to Lorie or Bill at (541)618-2384.

Sincerely,

Richard J. Drehobl
Field Manager
Ashland Resource Area

Enclosure(as stated)

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT
ASHLAND RESOURCE AREA

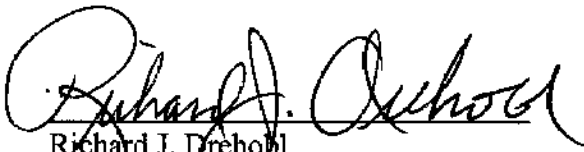
Environmental Assessment

FOR

Indian Soda Project

EA No. OR-110-00-03

This environmental assessment (EA) for the proposed Indian Soda Project was prepared utilizing a systematic interdisciplinary approach integrating the natural and social sciences and the environmental design arts with planning and decision making.



Richard J. Drechsel
Ashland Field Manager

07-05-00

Date

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ASHLAND RESOURCE AREA
EA COVER SHEET

Project Name and Number: INDIAN SODA PROJECT OR-110-00-03

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ASHLAND RESOURCE AREA
Indian Soda Project

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Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA; 40 CFR Parts 1500-1508) and the Department of the Interior's manual guidance on the National Environmental Policy Act of 1969 (516 DM 1-7).

A. PURPOSE AND NEED

An interdisciplinary team (ID Team) of resource specialists was formed to design projects that:

Reduce tree mortality and the risk of high intensity wildfire by restoring the vigor, resiliency, and stability of forest stands.

Provide a sustainable supply of timber and other forest products.

Manage developing forest stands to promote desired tree species, tree survival, tree growth, achieve a balance between wood volume production, quality of wood, and timber value at harvest.

The Ashland Field Manager also directed the ID Team to: 1) comply with the Record of Decision (ROD) for the Medford District Resource Management Plan; and 2) design projects that minimize the financial burden to taxpayers by utilizing the value of existing resources.

Two alternatives were developed for this project. A description of these alternatives can be found in Chapter II of this document.

B. CONFORMANCE WITH EXISTING LAND USE PLANS

The proposed forest management activities are in conformance with and tiered to the *Medford District Record of Decision and Resource Management Plan (RMP) (USDI 1995^b)*. This Resource Management Plan incorporates the earlier *PLAN MAINTENANCE DOCUMENTATION to Delay the Effective Date for Surveying 7 "Survey and Manage" and Protection Buffer Species for the Bureau of Land Management Districts and Field Offices in Oregon and California within the range of the Northern Spotted Owl (USDI and USDA 2000)*. *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (NWFP) (USDA and USDI 1994)*. *Little Butte Creek Watershed Analysis, Ver. 1.2 (USDI and USDA 1997)*. *Draft SEIS for amendment to the Survey and Manage, Protection Buffer, and other Mitigating Measures Standards and Guidelines (USDI and USDA 1999)*. These documents are available at the Medford BLM office and the Medford BLM web site at <<http://www.or.blm.gov/Medford/>>.

C. RELATIONSHIP TO STATUTES, REGULATIONS, AND OTHER PLANS

The proposed action and alternatives are in conformance with the direction given for the management of public lands in the Medford District by the Oregon and California Lands Act of 1937 (O&C Act) and the

Federal Land Policy and Management Act of 1976 (FLPMA).

This environmental assessment (EA) is being prepared to determine if the proposed action and the alternative would have a significant effect on the human environment thus requiring the preparation of an environmental impact statement (EIS) as prescribed in the National Environmental Policy Act of 1969. It is also being used to inform interested parties of the anticipated impacts and provide them with an opportunity to comment on the various alternatives.

D. DECISIONS TO BE MADE ON THIS ANALYSIS

The Ashland Resource Area Field Manager must decide:

- Whether or not the impacts of the proposed action are significant to the human environment beyond those impacts addressed in previous NEPA documents. (If the impacts are determined to be insignificant, then a Finding of No Significant Impact (FONSI) can be issued and a decision can be implemented. If any impacts are determined to be significant to the human environment, then an Environmental Impact Statement must be prepared before the Manager makes a decision.)
- Whether to implement the proposed action alternative or defer to the no action alternative

E. ISSUES OF CONCERN

The following issues were identified throughout the scoping process. All issues were reviewed by the ID Team. Issues that directly relate to the proposed action were analyzed in detail.

- a. Dense Stands/Forest Health - Many of the stands are overly dense because of fire exclusion. Dense stands are not vigorous (i.e., slow growth rates, too much competition for water, nutrients, and sunlight) and are more susceptible to insect infestation and high intensity wildfire. Dwarf mistletoe disease has reached epidemic proportions in Douglas-fir trees in portions of the Indian Soda Project Area. Shade intolerant tree species are also declining in number.
- b. Wildlife - Noise from logging operations results in short-term disturbances to wildlife (e.g. big game and nesting birds). Removal of trees and shrubs reduces habitat for some wildlife species (e.g., thinning of brush fields could reduce hiding cover for big game).
- c. Aquatic - Non-point source pollution (sedimentation) from logging activities degrades the aquatic ecosystem (e.g., reduced water quality for salmon, steelhead, and trout). Soda Creek and South Fork Little Butte Creek are listed as water quality limited on the Oregon Department of Environmental Quality 303(d) list.
- d. Access - Roads fragment the natural landscape and increase sediment to streams.
- e. Invasive, Nonnative Species - Activity and disturbance in an area increases the spread of nonnative species, such as star thistle in open environments of the project area.

- f. Hole-In-The-Rock Area of Critical Environmental Concern (ACEC) - Activity and disturbance in the area could change the scenic value of the ACEC.
- g. Leaf Fossil Site - Activity and disturbance in the area could increase access to the site and reduce the availability of fossils for future generations.
- h. Cumulative Effects - Affects of this project, along with other federal and non-federal projects, on the Little Butte Creek Watershed.

CHAPTER 2 Alternatives

A. INTRODUCTION

This chapter describes the proposed action alternative and the no action alternative. This chapter also outlines specific project mitigation features that are an essential part of the project design.

The Ashland Resource Area has developed a proposed action designed to meet the project objectives outlined in the Little Butte Creek Watershed Analysis (pages 204-208) and in accordance with the best management practices as outlined in the Medford District RMP (pages 149-177).

B. PROPOSED ACTION ALTERNATIVE

This alternative proposes to treat conifer stands that are in need of forest health restoration. Treatments would reduce the vegetative density by thinning through various silvicultural prescriptions that favor desired tree species. Variance in silvicultural prescriptions results from changes in the vegetation condition of the stand. Silvicultural prescriptions are located in the EA file. The EA file is available for review by calling the Ashland Planning Department at 541-618-2384. Proposed harvest methods of commercial timber and slash disposal treatments are listed in Appendix A (Table A-1).

This proposed action alternative includes project design features (PDFs). Included below are PDFs for the purpose of mitigating, reducing, or eliminating anticipated adverse environmental impacts. Analysis supporting the inclusion of PDFs can be found in Appendix A of this EA, and Appendix D and E of the RMP: Best Management Practices and Silvicultural Systems.

1. Conifer Treatments

Total planning area of public land within the Indian Soda Project = 5,147 acres.

Total area being proposed for commercial treatment (thinning/stand density) = 1,775 acres (+/- 5%).

Types of commercial treatment prescriptions are: 1) Mistletoe; 2) Pine; 3) Mixed conifer; and 4) Douglas-fir (wet and dry sites). Detailed prescription with a detailed map are located in the EA file.

Areas planned for fuels treatment would be re-examined, after harvest, by resource specialists to determine if the planned fuels treatment is still applicable. Based on this post harvest review, planned fuel reduction treatments may be changed to better meet the objectives outlined in this EA.

Mechanical treatment of fuels would be accomplished with a track mounted "Slash Buster" machine and is limited to slopes less than 50%. Manual treatment of areas includes cutting of existing ladder fuels and then hand piling this material so it can be burned. This type of treatment would be applied to some stands that are commercially and pre-commercially thinned.

Prescribed burning includes underburning, broadcast, and handpile burning.

Future maintenance of all areas treated in the project area would be needed. Underburning is the preferred method for maintaining these areas.

Prescribed burning operations would follow all requirements of the Oregon Smoke Management Plan and the Department of Environmental Quality Air Quality and Visibility Protection Program. Burning operations would be postponed if Medford or Grants Pass are under a "yellow" or "red" wood burning advisory.

Measures to reduce the potential level of smoke emissions from proposed burn sites would include mop-up to be completed as soon as practical after the fire, burning with lower fuel moisture in the smaller fuels to facilitate their quick and complete combustion, burning with higher fuel moisture in the larger fuels to minimize consumption and burn out time of those fuels, and covering hand piles to permit burning during the rainy season where there is a stronger possibility of atmospheric mixing and/or scrubbing of smoke.

To minimize loss in soil productivity and surface erosion, underburning would be planned and scheduled to result in low intensity burns, whenever possible, to reduce the loss of organic matter, nutrients, and subsequent site productivity.

2. Roads

Road Construction

Slash from road construction would be windrowed at the base of the fill slope to catch sediment. Where feasible, the running surface would be out sloped with rolling water dips. Fill slopes and fill shoulders would be seeded with native mix or other approved seed mix. Grade changes would be designed to minimize accumulation of road drainage in draws which may create unnaturally high peak flows in ephemeral and intermittent streams. The new road would be gated or blocked to passenger vehicles except for authorized use. The new road would be surfaced with a minimum of eight (8) inches of gravel.

Construction Restrictions: Road construction usually occurs during the dry season (June 15-October 15) in order to reduce the potential for soil erosion and degradation of water quality. However, it is sometimes necessary to construct roads during the fall or spring when soil moisture is optimum for compaction. This also helps to prevent fill settlement and cracking. All construction activities would be stopped during a rain event of 0.2 inches or more within a 24-hour period. If on-site information is inadequate, measurements from the nearest Remote Automated Weather Station would be used. Construction activities would usually not occur for at least 48 hours after rainfall has stopped or by approval of the Contract Administrator.

Short temporary roads (referred to as operator spurs) may be needed in a few instances. The length of operator spurs normally vary between 100 feet to 500 feet. They would be natural surfaced roads that would be constructed, used, and decommissioned during the dry season of the year, usually May 15 to October 15.

Road Decommissioning

Some existing roads would be decommissioned at locations listed in Appendix B.

Types of Decommissioning are as follows:

1. Natural Decommission - Sections of roads would be allowed to decommission naturally but may include some minimal, selective ripping, removal of drainage structures, constructing water bars and barricades.
2. Mechanical Decommission - Roads would be decommissioned mechanically and usually includes ripping, removing drainage structures, seeding and/or planting, mulching, constructing water bars and barricades.

BLM Road 37-3E-18.3: Road work is not expected to damage the fossil site. The road, used for the project, would be brushed, graded, and closed to vehicles after the timber sale.

Major Culverts in Streams

Five existing culverts that are severely deteriorated, undersized, or prevent fish passage would be upgraded, repaired, or replaced with a low water ford (i.e. culverts on roads 37-2E-13.0 (MP 0.15), 37-3E-32.3 (MP 0.13), 38-3E-17 (MP 0.7), and 38-3E-19 (MP 0.70 and 0.88)). New culverts would be sized to accommodate 100-year flood events and provide for fish passage. Instream work would occur between June 15 and September 15. Sediment and erosion controls would be used during construction to minimize stream sedimentation as much as possible. Sediment control techniques may include, but are not limited to, silt fences, hay bales or other coconut fiber bales. Streamflows would be isolated from the work site by installing a bypass flume or culvert, or by pumping the stream flow around the work area. All fill would be removed when permanently removing culverts. All removed material would be placed in locations where it would not be able to reenter the stream. If necessary, sediment and erosion controls would be placed around all sockpiled material. After construction, all exposed soils and waste areas would be seeded with a native or approved seed mix.

Helicopter landings

Helicopter landings on BLM land would be treated to reduce soil erosion. Treatment of the running surface would be dependent on site conditions and would include one of the following:

1. Subsoil/till or rip, then mulch and seed with native grasses or other approved seed.
2. Surface with durable rock material
3. Where natural rock occurs no treatment may be necessary

Fill slopes of helicopter landings would be seeded with an approved grass mix. (Emphasis on native species), and mulched except where natural rock occurs.

Hauling Restrictions

A seasonal hauling restriction would be required on natural surfaced (dirt) roads during the wet season (usually October 15 - June 15). This would protect the road from damage and decrease the amount of sedimentation that would occur. Some variations in these dates would be permitted dependent upon weather and soil moisture conditions of the roads. Refer to Appendix B for all hauling seasonal

restrictions.

Rock Surfacing and Quarries

Rock would be used to stabilize selected roads and landings and to minimize erosion. Rock would be obtained from one or more of the following existing quarries which are located in the SW1/4SE1/4 of section 19, and the SE1/4SW1/4 of section 29, T. 37 S., R. 3 E., and from the SW1/4NE1/4 of section 17, and the SE1/4SW1/4 of section 18 T.38 S. R.3 E. Roads would be surfaced as shown in the road summary table in Appendix B.

Dust Abatement

Dust abatement would provide driver safety and protect the road surface by stabilizing and binding the aggregate road surface. Water, lignin, magnesium chloride, road oil, or Bituminous Surface Treatment (BST) would be used. Oil or BST may appear to be a permanent surface improvement, however after log and rock haul it may be allowed to return to a rock road.

Road Use Agreements

Existing road agreements are between private companies and BLM for access. Road use agreements' M-250, M-303, M-660, M690, M-800, M-1006C would be used for access to BLM timberland.

Road Mileage Summary

Total miles of BLM controlled roads before the project:	= 60 miles
Proposed new road construction:	= 1 miles
Proposed decommissioning of existing roads:	= 5 miles
Total miles of BLM controlled roads after the project:	= 56 miles

Total miles of roads open after the project:	= 33 miles
Total miles of roads closed after the project:	= 23 miles

3. Riparian/Streams

Perennial and intermittent streams are present in the project area. Riparian Reserve boundaries for fish-bearing perennial streams extend from the edge of the active stream channel (where side slope meets stream bank) to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest (NWFP ROD, pg. C-31). Riparian reserves for non-fish-bearing perennial streams extend "...a distance of one site potential tree, or 150 feet slope distance (300 feet total, including both sides of the stream channel), whichever is greater." For intermittent streams, Riparian Reserve boundaries on each side of the channel are "...a distance equal to the height of one site-potential tree, or 100-feet slope distance...whichever is greatest." For wetlands greater than one acre, follow Riparian Reserve widths identified in the ROD Standards and Guidelines. Designate Riparian Reserve widths of 100 feet slope distance from the outer edge of wetlands and springs less than one acre. Designate Riparian Reserves to include active and potentially active landslides. Buffer

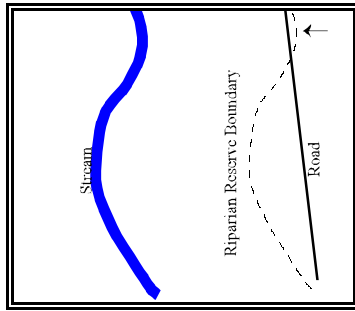


Figure 1

any management activities 200 feet above, to the bottom of slide deposits, and 75 feet along the sides of active and potentially active landslides.

Riparian Reserves have been mapped by specialists and the widths assigned according to the NWFP and Little Butte Watershed Analysis. In the event that new areas such as springs, wetlands, and ponds are discovered the below guidelines would apply.

The following no-treatment zones would be specified for the Project area.

- no treatments within 50 feet of each side of known fish-bearing streams in units where the average conifer height is less than 15 feet;
- no treatments within 25 feet of each side of known fish-bearing streams in units where the average conifer height is greater or equal to 15 feet;
- no treatments within 25 feet of each side of non-fish bearing streams;
- no treatment zones are to be measured from the edge of the stream channel;
- leave all trees within the active stream channel.
- no treatment if riparian vegetation and stream channel are in properly functioning condition.
- In draws that do not require Riparian Reserves, leave trees in the center of the draw bottoms for soil stability (10 feet on each side is recommended);
- Leave trees directly adjacent to areas of unstable soil or visible slumping from the waters edge to the slope break;
- Fire line would not be constructed within the “no-treatment zone” except for the occasional underburn where a fire line is necessary at the bottom of the unit. In this case, the fire line would run perpendicular to the stream, extending up to the active channel. Areas proposed for underburn would be reviewed by a BLM specialist;
- Slash shall not be piled or placed within the channel bottoms or streams, or within the no treatment zones identified above.

No commercial treatments are planned for within the Riparian Reserves in the Project area. Riparian Reserve treatments would include precommercial thinning and underburning.

- Precommercial thinning in riparian reserves would only occur after commercial and precommercial thinning of the upland areas has been completed. No trees 8 inches in diameter or greater would be cut during precommercial thinning. Staff specialists would be consulted prior to any precommercial thinning.
- Maintain all existing downed wood.
- Leave all snags and horizontally-leaning trees except where they need to be felled for safety reasons (per OSHA regulation) these logs would remain on site.
- Leave all riparian hardwoods.
- Riparian Reserves that would be part of prescribed burn would be monitored by staff specialists. In addition, no ignition would occur within Riparian Reserves, but a backing fire would be allowed to burn through in most places. Fire lines would be minimized or avoided in order to prevent the creation of “mini roads” that could route sediment into

the creek. Foam would not be used in Riparian Reserves.

Additional activities that would occur within the Riparian Reserve under this project would be designed to maintain the ecological health of watersheds and aquatic ecosystems according to the Aquatic Conservation Strategy (ACS) objectives (NWFP ROD, pg. C-31).

- Several miles (~3) of road would be decommissioned in the Riparian Reserve using mechanical or natural methods. Whatever the method, road drainage would not route sediment directly into streams, draws, or swales.
 - Culverts would be repaired, replaced, or removed within the Riparian Reserve. These activities would occur between June 15 and September 15.
 - Springs and stream sections would be fenced to exclude livestock grazing.
-
- Work may occur within a portion of Riparian Reserve where a sliver (~20 - 50 feet) of riparian reserve is located on the upslope side of an existing road (see ← on Fig. 1). This would be evaluated on a site-by-site basis by a staff specialist and only approved if it meets Aquatic Conservation Strategy objectives.

4. Threatened/Endangered Wildlife and Critical Habitat

Reserve from treatment the three designated 100-acre core areas for northern spotted owl (NSO) sites which were designated as known sites on 1/1/94. Place a seasonal restriction on treatment activities within 0.25 miles of the center of activity for the owl sites. This restriction would be in effect from March 1 through June 15 for disturbance activities, such as hauling, and from March 1 through September 30 for removal of habitat within the restricted area. This restriction could be lifted on an annual basis if protocol surveys by the BLM indicate that the site is not reproductive in a given year. Any new pairs of spotted owls found before or during the ground disturbing period would require the same seasonal restrictions as the designated NSO sites.

5. Special Status Species, Species to be Protected Through Survey and Manage Guidelines, and Protection Buffer Species

Species to be Protected Through Survey and Manage Guidelines are species identified in Appendix C of the RMP. The standards and guidelines contain four components, and priorities differ among them. They are to: 1) manage known sites, 2) survey prior to ground-disturbing activities, 3) conduct extensive surveys, or 4) conduct general regional surveys.

Bureau Sensitive species and their habitats would be managed, protected, and conserved such that the proposed action would not contribute to the need to list these species. Candidates for state listing are included here. These species would be protected by a variable radius reserve area. No management actions, except research, would be allowed within these reserve areas.

Bureau Assessment species would be protected or impacts mitigated from disturbance by any proposed actions. These plants would be protected by a variable radius buffer area. Some management actions may take place within the buffer area after on-site evaluation of the potential impacts and consideration of the overall species status and ecological requirements. *Cheilanthes intertexta* would require a “no management action” reserve area because of its rarity in the state.

Bureau Tracking and Watch species are species where more information is needed to determine rarity and therefore do not require protection. In some cases, these species may have impacts of disturbance mitigated. *Cypripedium montanum* would be protected under the Survey & Manage management recommendations for this plant.

Survey & Manage Strategy 1 and 2, and Protection Buffer species would be managed according to their specific management recommendations. These management recommendations are BLM Instruction Memoranda included as documents supplementing the NWFP. For those species without specific management recommendations, mitigation measures found in Appendix J2 of the FSEIS would be implemented. Generally, management would be protection of the population by a variable radius reserve area designed to maintain site conditions.

Survey & Manage Strategy 3 and 4 species require extensive and regional surveys. The purpose of these surveys is to acquire additional information to determine necessary levels of protection. Some extraordinary sites of these species would be managed and data collected as determined by the results of these surveys.

Protect the two known great gray owl nests. These sites would receive ¼ mile protection zones (125 acres), which would be managed as Late-Successional Reserves. Designate a ¼ mile "protection zone" around any additional great gray owl nest sites found before or during the contract period. Management of this zone would be in accordance with the standards and guidelines established in the Survey and Manage protocol for the great gray owl. Provide no-treatment buffers of 300 feet around meadows and natural openings.

There are currently no known goshawk sites. Any identified northern goshawk nests or activity centers that are located would receive no treatment buffers of approximately 30 acres.

There are no known mine adits or shafts in the project area. If any mines are found, mine adits and shafts that serve as roosts, maternity colonies or hibernacula for any of the five species of bats listed as FSEIS ROD, Survey and Manage/Buffer Protection Species, would be protected with 250 foot no treatment buffers and 1,000 foot no-treatment buffers for Thompson’s big-eared bat maternity colonies.

Surveys in the project area have located many known sites for two Survey and Manage mollusk species; *Prophysaon dubium* and *Prophysaon coeruleum*. The Management Recommendations for Terrestrial Mollusk Species, *Prophysaon coeruleum* and *Prophysaon dubium*, v.2.0, dated Nov., 1999, and the Management Recommendations for Survey and Manage Terrestrial Mollusks, version 2.0, dated, Oct., 1999 would be implemented in these projects in order to maintain microsite conditions and protect

mollusk populations. Documentation of the mollusk protection plan designed for the Indian Soda project is available at the Medford BLM Office.

Surveys in the project area have not located any red tree vole nests. If any nests are located, they would be protected as outlined in BLM-Instruction Memorandum No. OR-97-009, Interim Guidance for Survey and Manage Component 2 Species: Red Tree Vole, 11/4/96.

6. Harvest and Logging Systems

Logging systems for all units would be designated by the Purchaser and approved by the Authorized Officer prior to the start of any operation. Logging systems would only be approved when they meet all of the required project design features identified for these projects.

All units would be yarded in such a way that duff, litter, and coarse woody debris remaining after logging would be maintained at or greater than current levels as is operationally possible to protect the surface soil and maintain productivity.

Wherever trees are cut to be removed, directional felling away from draw bottoms would be practiced. Maximum operational suspension would be practiced to alleviate gouging and other disturbance on steep draw side slopes and headwalls. Trees would be felled to the lead in relation to the skid roads. The intent is to minimize the yarding damage to leave trees and regeneration under a conventional groundbased system.

For all cable yarding, maximum operational suspension would be maintained on slopes greater than 50 percent. Minimum corridor widths (generally less than 15 feet in width) would be utilized to assure silvicultural prescriptions and objectives are met.

Maximum operational suspension would be practiced to alleviate gouging and other disturbance on steep draw side slopes and headwalls. Trees would be felled to the lead in relation to the cable corridors. The intent is to minimize soil disturbance and yarding damage to leave trees and regeneration under a conventional cable logging system.

Skyline and tractor yarding would be avoided up and down bottoms of draws. Skid road locations would avoid ground with slopes over 35%. The intent is to minimize occurrence of erosion in existing areas of concentrated surface flow.

All skid road locations would be approved by BLM. Maximum area in skid trails would be less than 12%. The intent is to minimize areas affected by tractors and other mechanical equipment (disturbance, particle displacement, deflection, and compaction) and thus minimize productivity loss.

Existing skid roads would be utilized when possible. The intent is to minimize effects over existing conditions.

All skid roads would be water barred according to BLM standards. The intent is to minimize erosion and routing of concentrated rain and snow melt to streams.

Tractor yarding would normally take place when soil moisture is less than 20 percent at a depth of four inches, usually June 15 to October 1.

Tractor yarding would be allowed on snow only when the snow pack is sufficient to protect the soil. Tractor yarding would be allowed to start when there is a minimum of a twenty-four (24) inch snow depth. No logging would be allowed once the snow depth deteriorates below eighteen (18) to protect the soil from compaction. Skid trail spacing and soil moisture requirements would be waived if tractor yarding on snow occurs.

Every effort would be made to maintain canopy cover over skid roads. The intent is to minimize snow-melt on disturbed earth.

Noise from any helicopter operations may be partially mitigated by regulating operating hours, days, and seasons through portions of the project area. Generally, any helicopter logging closer than ½ mile of a residence would be restricted to an operating period of 8:00 a.m. to 5:00 p.m., Monday through Friday; any helicopter logging located ½ to 1 mile from a residence would be restricted to an operating period of 6:00 a.m. to 6:00 p.m., Monday through Saturday; and no operating time restriction would be enforced when helicopter operations are greater than 1 mile from a residence.

7. Wildlife Trees/ Dead and Down Material

Reserve from harvest a minimum of 2 snags greater than 16" DBH per acre (where possible). Retention of all snags greater than 16 inches DBH within the interior of the stands would mitigate impacts to pileated woodpeckers, saw-whet owls, and several of the bat species that use large snags as roosts.

Do not target for removal large, broken-top trees and large snags with loose bark on ridgetops. Retain and protect these structures where possible.

8. Cultural Resources

A field survey was conducted for sites of cultural value such as historical or prehistorical ruins, graves or grave markers, fossils, or artifacts. The survey was reviewed by the District Archeologist and the State Historic Preservation Officer was notified of the result. Sites would be protected to retain their cultural value. If additional sites are located, these also would be protected.

9. Invasive, Nonnative Species

To minimize the spread of weeds, vehicle movement on gated and newly constructed roads would be limited to the dry season except on roads where alternative seasons of use are required to implement the project. Seeding of native grasses and/or adapted grasses on disturbed soil (e.g., new road construction, road ripping, log landings, prescribed burns, etc.) would be required. Seeding of native grasses and/or adapted grasses on disturbed soil created by prescribed burns would be evaluated on a case by case basis.

Chemical control would be employed, as outlined in the Medford District's Integrated Weed Management Plan and Environmental Assessment (EA) #OR-110-98-14, tiered to the Northwest Area

Noxious Weed Control Program Environmental Impact Statement prepared 12-85 and amended 3-87. In progress research by Univ. California Cooperative Extension, U.C. Davis near Yreka, California has shown great promise in interseeding perennial grasses following treatment with the herbicide "Transline" to control and convert heavily infested stands of yellow starthistle to perennial grass.

Currently the majority of the yellow starthistle invasion in the Indian Soda analysis area occurs along road ways and a gravel storage pile in T.37S.,R.3E. Section 18 on BLM road 37-3E-18.1 Knapweed species are also becoming established along roadways at upper elevations. Chemical treatment of these infestations at this time could eliminate these populations and prevent further spread of these species into the surrounding area. This is imperative as many of the plant communities within the Indian-Soda analysis area are currently in intact condition.

Prescribed grazing also may be effective in the control of noxious weeds. Strict attention must be paid to the duration and season of use in which the grazing takes place. Grazing should be imposed to get the greatest consumption of above ground biomass in the shortest period of time within reason. The purpose of this prescribed grazing is to eliminate weeds before they can set seed and provide an open herbaceous canopy for shorter statured native species. When possible interseeding (no till drill) of summer dormant perennial grasses in the fall following a hot burn should take place. Where interseeding is not feasible broadcast seeding should take place. Additional seeding should be done on areas needing additional plants and other species of grasses and forbs. The first growing season following the fall burn and seeding, grazing with cattle should begin in the spring.

10. Range

Protect existing fences from logging activity (e.g., timber felling away from fences). Protect rangeland improvements in the fire hazard reduction units.

Two spring sources and a section of Soda Creek have been identified to be fenced and off-site water developed as part of the proposed management activity. Additional springs and water sources may be fenced and developed in the future when feasible.

- Protect and maintain all existing improvements such as off site water developments, fences, corrals, and reservoirs.
- Fence riparian area and meadow (~ ½ acre) located in the southeast quarter of 37S 3E Sec 31, along the 37-3-32.2 road. An off-site water source would be developed nearby.
- Fence springs and wetted meadow area in 37S 3E Sec 31 along 37-3-31 road and develop a spring box to pipe water out of the meadow area into a watering trough.

C. NO ACTION

Analysis of this alternative provides a baseline against which the effects of an action alternative can be compared. For this EA, the no action alternative is defined as not implementing any vegetation management projects.

D. ALTERNATIVE CONSIDERED BUT ELIMINATED FROM ANALYSIS

In addition to the alternatives analyzed in detail in this EA, the ID team considered the removal of all mistletoe infested trees.

1. Wildlife Impacts

A significant percentage (estimated 30%-50%) of spotted owls in the southwest Oregon region use mistletoe brooms for nesting. Douglas-fir dwarf mistletoe is a naturally occurring tree pathogen which creates habitat used by many wildlife species. Mistletoe provides food, shelter, and nesting for many wildlife species including several spotted owl prey species. Elimination of mistletoe would not be consistent with promoting the ecological health of the watershed.

2. Aquatic Impacts

Removing the infested trees from Riparian Reserves would not meet the objectives of the Aquatic Conservation Strategy. Removing large-diameter trees from streamside areas would reduce the amount of large woody debris available for fish habitat. Habitat complexity, overwintering habitat, spawning gravels, and nutrients would all be negatively affected.

CHAPTER 3 Affected Environment

INTRODUCTION

This chapter describes the present condition of the environment within the proposed project area that would be affected by the alternatives. The information in this chapter outlines a general baseline for determining the effects of the alternatives. No attempt has been made to describe every detail of every resource within the proposed project area. The information is organized around the major issues identified by the interdisciplinary team. Only enough detail has been given to determine if any of the alternatives would cause significant impacts to the human environment as defined in 40 CFR 1508.27.

GENERAL DESCRIPTION OF THE PROPOSED PROJECT AREA

A description of the lands and resources in the Ashland Resource Area is presented in Chapter 3 of the Final Medford District Resource Management Plan/Environmental Impact Statement (RMP 1995). Also, a detailed description of the Little Butte Creek watershed may be found in the Little Butte Creek Watershed Analysis, completed in November 1997. This document is available at the Ashland Resource Area, Medford District BLM Office and on the Medford BLM web site at <http://www.or.blm.gov/Medford/Medwatershed.html>.

A. VEGETATION

The vegetation native to the watershed is a result of time, the unique geology of the area, and human influences. Over the course of thousands of years, native inhabitants regularly used fire on the landscape for a wide variety of purposes. Natural disturbances such as lightning fires, windstorms and drought contributed to the variation. The lower elevation areas would have been dominated by grassland, oak savanna, and open oak/pine woodland. In the upper valley/canyon area prime black oak woodland probably existed. Because of fire exclusion these areas now appear to be closed canopy Douglas-fir forest. Many mixed-conifer stands of the canyon and high plateau sections were comparatively open, with a higher proportion of mature ponderosa and sugar pine than at present. Infrequent, stand-replacing natural fires on the high plateau may have played a dominant role in that portion of the watershed.

Due to frequent disturbance, historic forest lands were generally more open, had fewer trees per acre, trees of larger diameter, and a different species composition. These stands generally had more large diameter ponderosa pine, oak species, incense cedar, and native grasses. In the moist microsites where Douglas-fir is better adapted, the forest stands probably developed old-growth forest characteristics because of the frequent disturbance regime. Disturbances were probably as frequent as every 1 to 25 years. In the project area, many of the commercial forest stands originated between 1854 and 1929. Most of the forest stands became established within 10 years after a fire although the harsher sites may have taken 30 to 40 years to become forested. Because the last, large fires were forest-replacing in nature, individual timber stands tend to be fine grained. This means that there are many trees of the same age class and almost equal in height with some older trees scattered throughout the stand. The majority of the trees in the project area are between 70 and 145 years old. However, there are 146 to 363 year old trees in fewer numbers. The oldest trees found were 341 and 363 years old.

The Indian Soda Project area encompasses approximately 7,240 total acres of which BLM administers approximately 5,147 acres. The Indian Soda project area is presently composed of the following vegetation types: 6% of the land-base is grassland, 2% hardwood/woodland, 21% early seral conifer species, 1% small pole timber, and 70% large pole and mature timber.

1. Forestry

Some of the stands within the Indian Soda project area have been previously harvested. Natural mortality has also created

openings, as large as one acre, in the canopy layer. Natural mortality is a result of dwarf mistletoe, root rot diseases, bark beetles and windthrow. The understory of these stands consists of dense pockets of conifer regeneration and shrubs. The regeneration ranges from seedling to small pole size trees, and many of these trees are suppressed. The forest stands, containing both hardwoods and conifers, would benefit from precommercial thinning. There are approximately 400 acres of natural stands and reforestation units in need of precommercial treatment.

Many of the stands in the project area have a diverse vertical stand structure with occasional older trees scattered throughout the stands. Most mid and mature condition class forest stands are in the stem exclusion and understory reinitiation stages of development. These stands often have a closed canopy, high stocking levels, and many suppressed trees. The average canopy closure for the Indian Soda project area is 86 percent and ranges from 57 to 96 percent. Some forest stands have been selectively logged, commercially thinned or have suffered mortality from natural disturbance. These stands tend to be more diverse in species composition and vertical structure.

There are three tree series in the Indian Soda project area: Douglas-fir, ponderosa pine, and white oak. The PSME (Douglas-fir)/RHDI (poison oak) and PSME/RHDI-BEPI (Piper's Oregongrape) plant associations are most prevalent at lower elevations and on dry ridges; as are the oak series and pine series plant associations. As the elevation increases and rainfall is more abundant, or the aspect is more conducive to cooler temperatures, plant associations most often found include PSME-PIPO (ponderosa pine), PSME-ABCO (white fir)-HODI (Creambrush oceanspray), PSME-ABCO, and PSME/BENE (dwarf Oregongrape).

Subtle changes in species composition and stand structure are occurring over the landscape. Some trees with old-growth characteristics are dying as a result of increased competition with second growth trees for limited resources. Douglas-fir dwarf mistletoe has killed patches of large diameter Douglas-fir trees. In the Indian Soda project area most Douglas-fir stands have dwarf mistletoe to some degree. White fir, the most shade tolerant species in the project area, is replacing Douglas-fir, ponderosa pine, sugar pine and incense cedar because of its more shade-tolerant nature. Douglas-fir is encroaching upon the edges of the oak woodlands, and mortality of Douglas-fir along these edges has been noticeable during years of drought. In the mid-size vegetation condition class, suppressed shrubs and hardwood trees beneath the dominant tree canopy layer are dying. Pacific madrone and white and black oak have dropped out of conifer stands where light and water have become limiting. Shrub species dying out of the conifer stands include deerbrush ceanothus, creambrush oceanspray, and serviceberry.

Currently, the stocking levels of stands throughout the project area are high. This is primarily due to the lack of large acreage fires since the early 1900's and effective fire suppression. Total trees per acre range from 112 to 399. The average for the Indian Soda project area is 51 trees per acre. Average radial growth for the past ten years is 0.70 inches. Many stands in the project area have a relative density of 0.700 or greater and this indicates that physiologically the trees are at the point of suppression and mortality. High vegetation densities also indicate an increased potential for stand replacing fire. The average tree vigor index, as measured by leaf area index is 70 for Douglas-fir and 20 for ponderosa pine. Trees with vigor indices below 30 would succumb to attack from bark beetles of relatively low intensity. Trees with vigor between 30-70 can withstand progressively higher attacks but are still in danger of mortality from the insect attacks. Trees with vigor between 70-100 can generally survive one or more years of relatively heavy attacks and trees with indices above 100 cannot be killed by bark beetles (Waring, 1980).

Bark beetle infestations are present in the project area. Western pine beetles (*Dendroctonus brevicomis*) are attacking large diameter pines while flatheaded fir borers (*Melanophila drummondi*) and Douglas-fir beetles (*Dendroctonus pseudotsugae*) are killing Douglas-fir. At the higher elevations the fir engraver beetle (*Scolytus ventralis*) is killing mistletoe and disease stressed true firs. High tree stocking levels are stressing the trees physiologically, enabling the beetles to enter and kill the trees.

Laminated root rot (*Phellinus weirii*) and annosus root rot (*Fomes annosus*) are the most significant forest pathogens that are changing the forest stand structure and forest development pattern. Both are found in small patches at the higher elevations of the Indian Soda project area. *Phellinus pini* (red ring rot) is affecting Douglas-fir and ponderosa pine. It is

apparent that the disease is most common in stressed trees. Some of the infected trees are beginning to die or are subject to stem breakage thus allowing light to reach the forest floor and the understory reinitiation stage to begin. *Phaeolous schweinitzii* (brown cubical butt rot) is also present.

In the Indian Soda project area, the overall average amount of coarse woody material (CWM) is 5.7 tons per acre. The coarse woody material stem diameters were concentrated in the 3 to 31 inch classes at the large end and averaged 28.5 feet in length. Coarse woody material was most often found to be in a decomposition class 3 which is characterized by very little bark, no twigs, but a solid stem.

2. Special Status Vascular Plants

Surveys for Special Status Plants were initiated in 1998 and completed in 1999. Known sites within the project area are listed below.

Scientific Name	Common Name	Status*	TNC Rank*	Sites
<i>Cheilanthes intertexta</i>	coastal lipfern	A	G5/S1	1
<i>Cimicifuga elata</i>	tall bugbane	S, SC	G2/S2	3
<i>Cypripedium fasciculatum</i>	clustered lady's-slipper	S, SC	G3G4/S2	4
<i>Cypripedium montanum</i>	mountain lady's-slipper	T	G4G5/S4	4
<i>Perideridia howellii</i>	Howell's false-caraway	W	G4/S3	2
<i>Ribes inerme</i> var. <i>klamathense</i>	Klamath gooseberry	T	G5T3?/SU	1

*

A = BLM Assessment species in Oregon

S = BLM Sensitive species in Oregon

SC = Oregon State candidate

T = BLM Tracking species in Oregon

W = BLM Watch species in Oregon

G = Global rank

S = State rank

T = Trinomial (subspecies, variety, race) rank

U = Unknown rank

1 = Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation.

2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation).

3 = Rare, uncommon or threatened but not immediately imperiled.

4 = Not rare and apparently secure but with cause for long-term concern.

5 = Demonstrably widespread, abundant, and secure.

Cheilanthes intertexta is a rare fern in Oregon known only from Douglas and Jackson counties. Southern Oregon is the northern extent of this ferns range. It occurs in California and Nevada where it is not considered rare. *Cheilanthes intertexta* habitat is rock crevices on rock outcrops. This is the only known site on the Medford District.

Cimicifuga elata is known from British Columbia to southern Oregon west of the Cascade Range. It is considered rare throughout its range. The populations in southern Oregon differ morphologically, the habitat is more open, and the populations are larger than what is found to the north. This data suggests that southern Oregon populations could be a distinct variety or subspecies. BLM manages sites of *Cimicifuga elata* through an interagency Conservation Strategy with the Forest Service and the Army Corps of Engineers.

Cypripedium fasciculatum is a Bureau Sensitive plant, a Survey and Manage species under the FSEIS/ROD, and a candidate for listing with the State of Oregon under the Oregon Endangered Species Act. This plant is found east to the

Rocky Mountains but is considered rare throughout its range. Mid to late successional forests with canopy closures greater than 60% appear to be the optimum habitat for this species. *Cypripedium fasciculatum* is a slow-growing, long-lived orchid with a mycorrhizal association and an arguable dependence on fire. The Medford District has 140 sites of the clustered lady's-slipper, most with less than 10 shoots per site. Since numerous shoots can arise from a single rhizome, the number of individuals can be far less than the number indicated by the aerial shoots. Sites would be managed according to the Survey & Manage management recommendations of BLM Instruction Memorandum No. OR-99-27.

Cypripedium montanum is a Bureau Tracking plant, a Survey and Manage species under the FSEIS/ROD, and a candidate for listing with the State of Oregon under the Oregon Endangered Species Act. This orchid is known from California to Alaska and east to the Rocky Mountains. It is considered rare through much of its range. *Cypripedium montanum* occurs in a broad range of habitats. On the Medford District, it occurs in forests with 60 to 80 percent canopy closure, often with *Cypripedium fasciculatum*. There are 139 sites on the Medford District. Sites would be managed according to the Survey & Manage management recommendations of BLM Instruction Memorandum No. OR-99-27.

3. Survey & Manage Vascular Plants, Fungi, Lichens, and Bryophytes

Surveys for Survey & Manage vascular plants, fungi, lichens, and bryophytes were initiated in 1998 and completed for vascular plants, lichens, and bryophytes in 1999. In November 1999, new survey protocols were developed for seven species of Survey & Manage fungi. These survey protocols were met for the fall fruiting fungi on 1470 acres from November 1999 to January 2000. Completion of fall fungi surveys for 328 acres are scheduled for October to December 2000. Spring survey protocol for *Sarcosoma mexicana* is scheduled for March to May 2000. Additional sites of *Otidea onotica* and *Sarcosoma mexicana* are expected to be discovered. Known sites within the project area are listed below.

<u>Species</u>	<u>NFP Survey Strategy*</u>	<u>Taxa Group</u>	<u>TNC*</u>	<u>Sites</u>
<i>Cantharellus formosus</i>	1, 3	fungus	-	1
<i>Calicium viride</i>	4	lichen	-	1
<i>Cypripedium fasciculatum</i>	1, 2	vascular plant	G3G4/S2	4
<i>Cypripedium montanum</i>	1, 2	vascular plant	G4G5/S4	4
<i>Gyromytra montana</i>	3, 4	fungus	-	2
<i>Leptogium saturninum</i>	4	lichen	-	1
<i>Lobaria hallii</i>	1, 3	lichen	-	1
<i>Omphalina ericetorum</i> (<i>Phycotonis e.</i>)	3, 4	fungus	-	1
<i>Otidea onotica</i>	3, PB	fungus	-	1
<i>Pithya vulgaris</i>	1, 3	fungus	G4/S1	5
<i>Plectania milleri</i>	1, 3	fungus	G1/S1	1
<i>Ptilidium californicum</i>	1, 2, PB	bryophyte	-	4
<i>Sarcosoma mexicana</i>	3, PB	fungus	-	4

*

- 1) manage known sites. Highest priority with appropriate action usually, protection.
- 2) survey prior to ground-disturbing activities. Designed to locate new sites of rare species and establish management sites.
- 3) conduct extensive surveys. Designed for difficult to survey for species.
- 4) conduct general regional surveys. Designed to gather information for species particularly poorly known.

G = Global rank

S = State rank

1 = Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation.

2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation).

3 = Rare, uncommon or threatened but not immediately imperiled.

4 = Not rare and apparently secure but with cause for long-term concern.

5 = Demonstrably widespread, abundant, and secure.

Cantharellus formosus is a rare chanterelle that is found from California to British Columbia. Recent data shows this species to be abundant in young forests. Its abundance and broad distribution has lead to the proposal to drop this species off the S&M list in the Draft SEIS for amendment to the Survey and Manage, Protection Buffer, and other Mitigating Measures Standards and Guidelines. Current management recommendations do not require special management.

Lobaria hallii is a rare nitrogen-fixing lichen that occurs from northern California to Alaska and east to the Rocky Mountains. Recent data shows a greater abundance and distribution and a broad ecological amplitude. For these reasons and that the species is not closely associated with late-successional, old-growth forest, it has been proposed to be dropped from the S&M list in the Draft SEIS for amendment to the Survey and Manage, Protection Buffer, and other Mitigating Measures Standards and Guidelines. Current management follows Appendix J2 or the NFP.

Otidea onotica is an uncommon cup fungus that is widely distributed throughout the North Temperate zone. Habitat information is necessary before conclusions can be made regarding this species viability. Current management recommendations follow BLM Instruction Memorandum OR-98-003.

Pithya vulgaris is a rare cup fungus that is widely distributed throughout the North Temperate zone. On the Medford District, this fungus is restricted to forests with true firs. There are approximately 50 known sites on the District. Current management recommendations follow BLM Instruction Memorandum OR-98-003.

Plectania milleri is a rare cup fungus that is a Pacific Northwest endemic. The few known sites on the District are associated with conifer duff. Current management recommendations follow BLM Instruction Memorandum OR-98-003.

Ptilidium californicum is a liverwort that is found along the Pacific Rim. In the Pacific Northwest, the southern extent of its range is northern California. Recent surveys have discovered many large populations in our area. The area of concern for this liverwort is proposed to be adjusted to include northern California and southern Oregon. Current management recommendations follow BLM Instruction Memorandum OR-99-039.

Sarcosoma mexicana is an uncommon cup fungus that is known from western North America and Mexico. This locally common fungus is found under conifers usually with a white fir component. Current management follows Appendix J2 or the NFP.

4. Noxious Weeds

There are at least 200 non-native plant species established in the watershed. Probably half of these are on the valley floor and in the low foothills where human disturbance has been most intense and climate is most favorable for the invaders. In these areas, the majority of the biomass of herbaceous vegetation is composed of non-native species. They are also abundant and often dominant in moist meadows at higher elevations and other disturbed open areas where seeding has occurred in the past.

Noxious weeds designated by the Oregon Dept. of Agriculture (ODA) are divided into three groups: "T" (target list which are highest priority for control), "A" (second highest priority for control), and "B" (third highest priority for control). A 1997 noxious weed inventory in the Little Butte Creek Watershed identified six noxious weed species: yellow starthistle ("T"), rush skeleton weed ("T"), Canada thistle ("A"), Scotch broom ("B"), spotted knapweed ("B"), and diffuse knapweed ("B"). Range monitoring in 1996 identified four additional noxious weed species in the watershed: leafy spurge ("T"), purple loosestrife ("A"), St. Johnswort (Klamath weed) ("B"), and medusahead rye ("B"). Other noxious weeds that are known to occur in the surrounding area and have potential to spread to Little Butte Watershed are: squarrose knapweed ("T"), tansy ragwort ("T"), French broom ("B"), Italian thistle ("B"), meadow knapweed ("B"), and Russian knapweed ("B").

Five unwanted species that have not been designated as noxious weeds by the ODA have also been seen in the Little Butte Creek Watershed: ripgut brome, hedgehog dogtail, dodder, Spanish broom, and common skeleton weed.

B. WILDLIFE

The project area encompasses a broad elevation range and is primarily composed of the following natural plant communities (generally in order of low to high elevation): grass, forbs, herbaceous; shrubs; hardwood/woodlands; and coniferous forests.

These plant communities and the associated condition classes provide habitat for approximately 200 terrestrial wildlife species that are known or suspected to inhabit the watershed. The following table lists the various vegetative condition classes/habitat types and the wildlife species that are representative of each habitat type:

Representative Wildlife Species

Condition Class	Representative Species
Grass, forbs, herbaceous	Gopher snake, western meadowlark, California ground squirrel
Shrubs	Western fence lizard, wrentit, dusky-footed woodrat
Hardwood/woodlands	Ringneck snake, acorn woodpecker, western gray squirrel
Seedling/sapling	Northwestern garter snake, mountain quail, pocket gopher
Pole (5-11" DBH)	Southern alligator lizard, golden-crowned kinglet, porcupine
Large pole (11-21" DBH)	Ensatina, Steller's jay, mountain lion
Mature/old-growth (21+" DBH)	Northern spotted owl, northern flying squirrel

Retention of Habitat Diversity

Although wildlife species richness is high, elements of habitat decline are present. A gradual loss of habitats such as oak savannahs, meadows, and brushfields has resulted from the exclusion of fire from the landscape. Grassy meadow habitat is less productive as wildlife habitat due to damage from cattle grazing and the encroachment of undesirable noxious weeds.

Most of the current early/seedling-sapling and pole habitat is the result of past timber harvest. Consequently, snags and coarse woody material are often lacking in these areas. Populations of species requiring snags and large coarse woody material have likely declined in these condition classes, while populations of species not requiring these components and associated with open areas and small trees have likely increased. Early successional species such as deer and elk have benefitted from the increased forage base. This can be seen by the increase in size of the elk herd in and around the Little Butte Creek watershed. In the early 1970s, the herd consisted of about 30 to 50 animals. Currently the herd is estimated at over 400 (Thiebes 1996).

In the coniferous plant communities, snag density and down woody material is inadequate in much of the early seral and pole condition classes due primarily to past timber harvest. Fire suppression has contributed to some pole and mature conifer stands becoming more dense than they would have under natural fire regimes. The lack of intrastand structure in these stands generally results in lower species richness in comparison to other condition classes. The abundance of mature/old-growth habitat has declined due to past timber harvest.

Some species have been adversely affected by a general decline in their habitat within the watershed from historical levels. Loss or modification of habitat is probably most pronounced in the mature/old-growth condition class, and wildlife species associated with this habitat have likely been the most affected. The volume of logging in the watershed steadily increased from the 1950s through the 1980s with clearcutting as a predominant method of harvest (Little Butte Creek Watershed Analysis, 1997). Mature/old-growth forests were historically prominent on the wetter, northern aspects of the watershed.

Although supportive data are unavailable, the general decline in habitat condition probably has not resulted in a significant decrease in the number of wildlife species present. However, there has likely been substantial change in wildlife species abundance and distribution.

Connectivity

Connectivity refers to landscape-scale, interconnected forest areas that provide continuous forest habitat for wildlife species movement. Some of the species dependent on connectivity include special status species, game species, and invertebrates. This movement of individuals in the short term is essential to the movement of genetic material and the prevention of genetic isolation in the long term. Many forest species either cannot, or are reluctant to, move through large openings.

Within the project area itself, connectivity is provided through an extensive riparian reserve system and five one-hundred acre northern spotted owl and great gray owl nest core reserves. These reserves provide internal travel corridors and habitat areas within the project area and connectivity to the larger landscape outside of the project area.

Landscape

An overview of the larger scale landscape of which the Indian Soda project is a part, reveals that the project area is adjoined to the east by a large Late Successional Reserve (LSR) consisting of 52,980 acres in the adjoining Rogue River and Winema National Forests. The LSR provides a connectivity link between the project area and other late successional forests. Forty-eight percent of the Little Butte Creek 5th field watershed is under federal ownership. The majority of the private land in the area is to the west and south of the project.

Threatened/Endangered Species

The northern spotted owl, a species listed as threatened under the Endangered Species Act (ESA) of 1973, as amended, is present in the project area. There is also potential for the presence of bald eagles, listed as threatened under the ESA.

As part of the Northwest Forest Plan and BLM Resource Management Plan, spotted owl core areas were established around known spotted owl nests in 1994. The purpose of the owl cores is to provide suitable habitat for nesting owls and other late-successional species outside of the Late Successional Reserve (LSR) system. This provides wider distribution of spotted owl populations and increases genetic exchange between populations in LSRs.

Three 100 acre spotted owl core areas (that are managed as Late Successional Reserves under the Northwest Forest Plan) are located within the boundary of the Indian Soda project.

The Indian Soda project area encompasses approximately 3,275 acres of suitable northern spotted owl habitat on BLM managed lands. This is 69 percent of the forest capable acres. Suitable habitat is defined as habitat which provides for nesting, roosting or foraging (NRF), and dispersal. Suitable habitat generally has the following attributes: high degree of canopy closure (approx. 60%+), multilayered canopy, presence of large snags, and coarse woody debris.

In addition to the suitable habitat, approximately 304 acres within the Indian Soda project area provide spotted owl dispersal habitat. Dispersal habitat affords spotted owls some degree of protection from predators during dispersal, and may be used for foraging on a limited basis, but does not function as NRF habitat. Dispersal habitat consists of conifer stands in the large pole and mature/old-growth condition classes with 40-60 percent canopy closure.

Special Status Species

Species are recognized as "special status" if they are federally listed as Threatened or Endangered, proposed or a candidate

for federal listing as Threatened or Endangered, a BLM sensitive or assessment species. BLM policy is to manage for the conservation of these species and their habitat so as not to contribute to the need to list and to recover these species. Twenty special status wildlife species are known or suspected to be present in the Indian Soda project area. The following table lists these species, their status, and the primary reason they are listed as special status species.

Special Status Wildlife Species

Species	Status ¹	Primary Reason(s) for Status
Western Pond Turtle (<i>Clemmys marmorata</i>)	BS	Habitat loss/degradation, predation
California Mountain Kingsnake (<i>Lampropeltis zonata</i>)	BA	General rarity
Common Kingsnake (<i>Lampropeltis getulus</i>)	BA	General rarity
Northern Spotted Owl (<i>Strix occidentalis caurina</i>)	T	Timber harvest
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	T	Shooting, pesticides, disturbance
Northern Goshawk (<i>Accipiter gentilis</i>)	BS	Timber harvest
Great Gray Owl (<i>Strix nebulosa</i>)	BS/PB	Timber harvest
Flammulated Owl (<i>Otus flammeolus</i>)	BA	Timber harvest
Northern Saw-whet Owl (<i>Aegolius acadicus</i>)	BA	Timber harvest
Pileated Woodpecker (<i>Dryocopus pileatus</i>)	BA	Timber harvest
Lewis' Woodpecker (<i>Asyndesmus lewis</i>)	BA	Fire suppression, conifer encroachment of oak woodland habitat
Western Meadowlark (<i>Sturnella neglecta</i>)	BA	Development (residential and commercial)
Western Bluebird (<i>Sialia mexicana</i>)	BA	Development
Townsend's Big-eared Bat (<i>Plecotus townsendii</i>)	BS/PB	General rarity, lack of information
Fringed Myotis (<i>Myotis thysanodes</i>)	BS/PB	General rarity, lack of information

Species	Status ¹	Primary Reason(s) for Status
Long-eared Myotis (<i>Myotis evotis</i>)	BS/PB	General rarity, lack of information, timber harvest
Yuma Myotis (<i>Yuma myotis</i>)	BS	General rarity, lack of information
Long-legged Myotis (<i>Myotis volans</i>)	BS/PB	General rarity, lack of information, timber harvest
Pacific Pallid Bat (<i>Antrozous pallidus</i>)	BS/PB	General rarity, lack of information
Silver-haired Bat (<i>Lasionycteris noctivagans</i>)	PB	General rarity, lack of information

1/ Status:

- T - Listed as threatened under the ESA
- E - Listed as endangered under the ESA
- BS - Bureau sensitive
- BA - Bureau assessment
- PB - Designated to receive protection buffers in the NFP

Most of these species have been identified in the watershed or on immediately surrounding lands. No systematic surveys have been conducted for the avian species. Cameras have been placed in limited locations for verification of marten and fisher occurrence. To date, only marten have been verified; reliable anecdotal information also places fishers within the Little Butte Creek watershed within the past 20 years.

Survey and Manage Species

The Northwest Forest Plan provides extra protection for some wildlife species through a Survey and Manage standard and guideline. This standard and guideline provides protection for known sites, and directs that surveys be implemented before ground-disturbing activities. As a result of meeting the wildlife criteria, the project area is being surveyed for red tree voles, mollusks, and great gray owls.

Great gray owl

Nesting habitat for this species is typically mature/old-growth forest which is adjacent to meadows or clear-cuts used for foraging habitat. To date, two great gray owl nest sites have been located in the Indian Soda project. They would each receive 100 acre no-treatment buffers, in accordance with ROD and RMP guidelines.

Mollusks

Surveys in the project area have located many known sites for two Survey and Manage mollusk species; *Prophysaon dubium* and *Prophysaon coeruleum*. The Management Recommendations for Terrestrial Mollusk Species, *Prophysaon coeruleum* and *Prophysaon dubium*, v.2.0, dated Nov., 1999, and the Management Recommendations for Survey and Manage Terrestrial Mollusks, version 2.0, dated, Oct., 1999 would be implemented in these projects in order to maintain microsite conditions and protect mollusk populations.

Red Tree Voles

Surveys in the project area have not located any red tree vole nests. If any nests are located, they would be protected as outlined in BLM-Instruction Memorandum No. OR-97-009, Interim Guidance for Survey and Manage Component 2 Species: Red Tree Vole, 11/4/96.

C. AQUATIC/RIPARIAN

Fisheries

South Fork of Little Butte Creek is a Tier 1 key watershed contributing to the conservation of at-risk anadromous and resident fish species. Key watersheds are crucial to maintaining and recovering habitat for these at-risk species. Of the anadromous fish species in the South Fork of Little Butte Creek, Southern Oregon/Northern California (SONC) coho salmon (*O. kisutch*) are listed as threatened under the Endangered Species Act (ESA), Klamath Mountain Province (KMP) Steelhead (*O. mykiss*), and coastal cutthroat trout (*O. clarki clarki*) are candidate species. Pacific lamprey (*lampetra tridentata*) are also known to occur in this system but their populations are not well documented or understood¹. Other native fish species residing in the South Fork of Little Butte Creek watershed not listed under the ESA include: rainbow trout (*O. mykiss*), cutthroat trout (*O. clarki*), Klamath smallscale sucker (*Catostomus rimiculus*), and reticulate sculpin (*Cottus perplexus*).

The Talent Irrigation District (TID) diversion canals in Upper Little Butte Creek Watershed have allowed Klamath speckled dace to access and become established in the Little Butte Creek system². Other introduced fish such as reddsides, Eastern brook trout, several warm-water species, and the bullfrog compete with resident fish for available habitat and cause further loss through predation. Various non-native warmwater species reside in farm ponds on private lands.

Soda Creek, a tributary to South Fork of Little Butte, supports populations of KMP steelhead (*O. mykiss*), coastal cutthroat trout (*O. clarki*), resident rainbow trout (*O. mykiss*), and sculpin (*Cottus spp.*). Distribution of these fish throughout the Soda Creek drainage has been verified in surveys completed by BLM³ and ODFW⁴. Resident rainbow and cutthroat trout have been identified in both forks of Soda Creek (see Map 1). Impassable culverts restrict upstream movement of fish and other aquatic species throughout much of the west fork drainage of Soda Creek.

Habitat for other aquatic organisms such as Pacific giant salamanders (*Dicamptodon tenebrosus*), yellow legged frogs (*Rana boylei*), and aquatic garter snakes (*Thamnophis couchi*), may extend well beyond what is suitable habitat for salmonids though survey data for those species is lacking.

Fish Habitat

In general, native fish and other aquatic organisms need clean, cool water with cover, spawning gravel, and food to survive. Riparian vegetation plays an important role in maintaining healthy habitat for aquatic organisms. Large wood creates habitat for salmonids by providing cover from predators, refugia from current, and by creating pools, the preferred habitat of juvenile coho. The water that flows through these systems must be of cool temperatures to support cold water fish such as salmon and trout. Gravel, free of oxygen-choking sediments is a necessity for spawning fish. These factors all fit together within a larger context, described by the physical geography of an area.

¹ U.S.D.A. Forest Service and U.S.D.I. Bureau of Land Management. 1997. South Fork Little Butte Watershed Analysis. Version 1.2.

² Ibid # 1.

³ Bureau of Land Management. 1999. Presence/Absence Surveys: Soda Creek Survey Data.

⁴ Oregon Department of Fish and Wildlife. 1994. Aquatic Inventories Project: Soda Creek Survey Data.

Geology of the area suggests moderate to high erosion potential and is subject to landslides triggered by storm events and management activities that have compromised the integrity of these side slopes⁵. Effects of the 1997 flood are evident throughout this drainage. Remnant landslides, slumps, and scour are visible in many fingers of the drainage.

The erosive nature of this drainage in conjunction with numerous land management activities have resulted in a stream with limited habitat for cold water fish. Management practices have altered this landscape for the last several thousand years⁶. In the recent past, timber harvest, road building, fire exclusion, removing large wood from riparian areas, and grazing have greatly affected riparian areas and fish habitat. The combined effect of these activities has created a stream with less large wood, fewer pools, increased sedimentation and warmer temperatures.

Multi-storied riparian vegetation benefits the stream in many ways. Shrubs and low hanging vegetation provide cover from predators while large trees contribute wood to the stream channel. Vegetation keeps stream temperatures cool by shading the stream from solar radiation and root systems stabilize stream banks. These trees and shrubs also contribute nutrients to the system as coarse organic material that is crucial to the macroinvertebrate communities that support fish and other aquatic organism populations.

Large wood has been identified as a limiting factor in the South Fork of Little Butte Creek and in some sections of the Soda Creek system.⁷ According to riparian surveys, the lower sections of Soda Creek appear to have sufficient large wood material. Much of the established wood debris jams were “blown out” during the 1997 flood. Overtime, these complexes would naturally re-establish allowing the stream to reach a more natural distribution of pools and riffles. The effects of large wood on stream form and function are positive: creating pools, trapping sediment, providing cover for fish and other aquatic species, and stabilizing banks during high flow events.

Pool habitat is limited throughout Soda Creek according to habitat surveys conducted by ODFW⁸ although numerous scour pools were identified in the lower mile of Soda Creek. The stream is characterized by fast, turbulent flow with hydraulic jumps and chutes formed by boulders and bedrock that dominate the stream channel from the mouth, into the upper plateau. The upper sections of Soda Creek are comprised of small meandering streams reflecting the flatter headwater topography and wider floodplains.

The South Fork of Little Butte Creek and Soda Creek are identified by Oregon Department of Environmental Quality (ODEQ) as water quality limited under Section 303(d) of the Clean Water Act. From the mouth to Beaver Dam Creek, South Fork of Little Butte Creek is water quality limited due to flow modification, habitat modification, sediment, and summer temperature. Soda Creek is listed as water quality limited for sediment and it exceeds the maximum 7-day average for temperature (>64 F). Temperature monitors placed in five locations during the summer of 1998 found water temperatures ranged from 64.3 - 74.1 F in July and August.⁹ Lack of large wood, removal of riparian vegetation, past

⁵ Ibid #1.

⁶ Ibid #1

⁷ U.S. Department of Interior, Bureau of Land Management. 1998. Riparian Surveys: Soda Creek watershed.

⁸ Oregon Department of Fish and Wildlife. 1994. Aquatic Inventories Project: South Fork Little Butte Creek and tributaries.

⁹ U.S.D.I. Bureau of Land Management. 1998. Temperature monitor data: South Fork Little Butte drainage.

management activities, and natural soil/erosion have negatively effected water quality in this area. Roads and associated culverts can cause erosion and sedimentation if not properly maintained or installed. Improperly installed culverts are also migration barriers for fish and other aquatic organisms. Many culverts on the West Fork of Soda Creek are “perched,” creating a falls fish cannot negotiate. Five culverts have been identified as barriers to fish migration and are listed in Chapter 2. Several culverts contributing to sedimentation were also listed in Chapter 2. Culverts that hinder migration of fish and other aquatic organisms would be replaced and/or repaired and positioned such that fish passage is restored. Private landowners in the area would be contacted to encourage culvert replacement and road repair where fish passage is blocked and where erosion occurs.

Surveys conducted by BLM crews in 1995 and 1998 showed most areas within the Soda Creek drainage were in “properly functioning” condition with some “functioning at risk” and “non-functioning” stream segments (Table 3).¹⁰ Stream segments not properly functioning usually contained slumps, actively eroding banks, or lacked large wood. These conditions were also attributed to roads, grazing, and harvest activities.

Table 3. Functioning condition of streams within Indian Soda Project Area.

	Functioning Condition				
	PFC	FARU	FARD	NF	Total
Miles surveyed within Indian Soda	11.88	4.12	3.22	1.99	21.21
% of total miles surveyed	56	20	15	9	

PFC - properly functioning condition, FARU - functioning at risk: upward trend, FARD - functioning at risk: downward trend, NF - not functioning.

Riparian Reserves

Standard widths for Riparian Reserves are provided in the ROD.¹¹ Reserve widths correspond to stream type: the table below (Table 4) identifies miles of stream within each stream type. Riparian Reserves in this area fall within the mixed conifer zone with Douglas-fir being most common, ponderosa pine, sugar pine, incense cedar, and Pacific yew also present¹². Habitat surveys conducted by BLM¹³ and ODFW¹⁴ indicated mixed conifer dominated riparian areas with a substantial hardwood component in the lower mile of Soda Creek: big leaf maple, alder, and cottonwood.¹⁵ Most riparian areas have diverse age classes of conifers, forbes, and grasses. For a detailed description of riparian reserve widths consult the Record of Decision (ROD).¹⁶

¹⁰ Ibid #4.

¹¹ USDI Bureau of Land Management. 1995. Record of Decision and Resource Management Plan.

¹² Ibid #5.

¹³ Ibid #7.

¹⁴ Ibid #8.

¹⁵ Ibid #5.

¹⁶ Ibid # 8.

Table 4: Stream type within Indian Soda Project Area.

	Fish bearing	Non-fish bearing			
		Perennial	Intermittent	Dry draw	Total
Miles within Indian Soda	9.34	12.07	18.39	19.66	59.46

Human impacts within the riparian reserves can be seen throughout the Soda Creek drainage. Past activities included timber harvest, road building, and grazing. Removing wood from riparian areas for commercial uses, firewood, or to clean the stream of obstructions also occurred in the past. Clearcuts down into riparian areas have removed the large wood component along the stream and its tributaries in several areas throughout the drainage.

The headwaters of Soda Creek have been grazed for a number of years. High elevation meadows are susceptible to habitat degradation and are popular loafing areas because of their easy access and proximity to water, food, shade. Elk are also known to frequent some of these high elevation meadows. Current grazing practices encourage increased movement throughout the allotment to reduce negative impacts.¹⁷ Monitoring programs are in place to document upward trends on range land and as a tool for range management.

Conde Creek Road parallels Soda Creek in the lower section and then moves onto a ridge between the west and east forks of Soda Creek. Many spur roads and skid trails dissect the landscape altering riparian reserves by restricting stream meander, cut banks, culverts, and fill material. Off highway vehicle (OHV) driving on these spurs during the wet season can contribute additional sediment to the streams.

D. RANGE

The Keene Creek, Conde, Poole Hill, Deer Creek (Reno Lease), and Deadwood allotments are located within the project area. Livestock grazing preference is for 3331 A.U.M.'s from 5/1 to 9/30. The season of use and livestock preference varies by allotment.

High elevation meadows are popular loafing areas for cattle and elk because of their easy access and proximity to water, food, and shade. Elk frequent many of these high elevation meadows. Approximately 120 head of elk were observed in Conde Creek Meadow during the spring of 1999.

Current livestock grazing practices encourage increased movement throughout the allotment to reduce negative impacts. Monitoring programs are in place to document trends on range land and as a tool for range management. Current management practices are based on this monitoring with the objective of meeting rangeland health standards and maintaining trend in a stable or upward condition. Currently trend on the allotments within the planning area is stable to upward based on established nested frequency plot data. Riparian photo points and greenline surveys have been established throughout the area. A Coordinated Resource Management Plan (CRMP) is currently in place for the Deadwood Allotment.

E. FUELS

Fire is recognized as a key natural disturbance process throughout Southwest Oregon (Atzet and Wheeler 1982). Human-caused and lightning fires have been a source of disturbance to the landscape for thousands of years. Native Americans influenced vegetation patterns for over a thousand years by igniting fires to enhance values that were

¹⁷ Tom Jacobs. Range Conservation Officer, Medford District BLM. Personal communication. 1999.

important to their culture (Pullen 1996). Early settlers to this area used fire to improve grazing and farming and to expose rock and soil for mining. Fire has played an important role in influencing successional processes. Large fires were a common occurrence in the area based on fire scars and vegetative patterns and were of varying intensities.

Climate and topography combine to create the type of fire regime found throughout the Indian Soda project area. Fire regime is a broad term and is described as the frequency, severity and extent of fires occurring in an area (Agee, 1993). Vegetation types are helpful in delineating different fire regimes. Using vegetation types as a basis for fire regime delineation, three broad fire regimes within the project area were identified. These regimes are based on the effects from fire on the dominant vegetation.

Low-Severity Regime. This regime is characterized by vegetation types such as grasslands, shrub lands, hardwoods and mixed hardwood, and pine which are in the Interior Valley Vegetative Zone. These plant communities are adapted to recover rapidly from fire and are directly or indirectly dependent on fire for their continued persistence. The dominant trees within this regime are adapted to resist fire due to the thick bark they develop at a young age.

A low-severity regime is characterized by nearly continual summer drought; fires are frequent (1-25 years), burn with low intensity, and are widespread.

Moderate-Severity Regime. This regime is associated with the mixed coniferous vegetation type (Mixed Conifer Vegetative Zone). This regime is characterized by long summer dry periods; fires are frequent (25-100 years). This regime is the most difficult to characterize and is often located in a transitional position between low and high elevation forests. Fires burn with different degrees of intensity within this regime. Stand replacement fires as well as low intensity fires would occur depending on burning conditions. The overall effect of fire on the landscape is a mosaic burn. Approximately 80% of the project area is classified as a Low to Moderate Severity Regime.

High-Severity Regime. This regime is characterized by the White Fir Vegetation Zone. This environment is characterized by moist, cool conditions; fires are infrequent. Accurate fire return intervals have not been calculated because of the long intervals between fires. When fires occur, they are due to unusual conditions, such as drought periods associated with high winds. Large acreage fires, when they occur, are normally stand replacement fires.

In the early 1900s, uncontrolled fires were considered to be detrimental to forests. Suppression of all fires became a major goal of land management agencies. Since the 1950s, fire suppression has been very effective. As a result of the absence of fire there has been a build-up of unnatural fuel loadings and a change in vegetative conditions.

Based on calculations using fire return intervals, five fire cycles have been skipped in the southwest Oregon mixed conifer forests that occur at low elevations (Thomas and Agee 1986). Species, such as ponderosa pine and oaks, have decreased. Many stands, which were once open, are now heavily stocked with conifers. This has changed the horizontal and vertical structures of these stands. Surface fuels and the laddering effect of fuels have increased, which has increased the threat of crown fires which were once historically rare (Lotan et al. 1981).

Frequent low intensity fires serve as a thinning mechanism thereby naturally regulating the density of the forests by killing unsuited and small trees. In addition, ponderosa pine trees that thrive in fire prone environments quickly get shaded out by the more shade tolerant species in the absence of fire. As a result, some late-successional forests in the project area have undergone a transition from ponderosa pine stands to excessively dense fir stands. Trees growing at lower densities tend to be more fire-resistant and vigorous. Eventually they grow large and tall, enhancing the vertical and structural diversity of the forest.

Many of the seedling and pole size forests of the 20th century have failed to grow into old-growth forests because of the lack of thinning once provided by frequent fire. Consequently, much of the old-growth forest habitat has been lost along with diminished populations of old-growth dependent and related species.

Many forests have developed high tree densities. High density forests burn with increased intensity because of the unnaturally high fuel levels. High intensity fires can damage soils and often completely destroy riparian vegetation. Historically, low intensity fires often spared riparian areas, which reduced soil erosion and provided wildlife habitats following the event.

Fire history records of Southwest Oregon show an increase of high intensity, large fires over the last 20 years in the vegetation types associated with historic low-severity fire regimes and moderate-severity fire regimes. This trend is also seen throughout the west. Contributing factors to this increase are the increase of fuel loadings due to the absence of fire, recent drought conditions and past management practices. This trend of large stand-replacement fires is expected to continue unless fuels management activities are implemented to reduce existing fuel loadings.

Risk Assessment

Fire risk is the probability of when various ignition sources would cause a fire which threatens resources, property and life. Historical records show that lightning and human caused fires are common with lightning being the major source of fire starts. Other risks exist in the project area such as dispersed camp sites, recreational use, and major travel corridors. All of these contribute to the possibility of a fire occurring from human causes.

The highest risk areas are major ridge lines due to lightning strikes and lands adjacent to roads and private property due to the potential of human cause fires. Historic lightning occurrence indicates that there is the potential of lightning fires starting throughout all elevations within the watershed.

Some of the higher values at risk within this watershed are private residential and agricultural property, water quality, forest resources such as northern spotted owl core areas, mature/old growth stands, conifer plantations, recreation sites, historic sites, and Research Natural Areas.

Fuel Hazard

Fuel hazard assess vegetation by type, arrangement, volume, condition, and location, all of which determines the threat of ignition, spread and difficulty of control of a fire. Hazard ratings for the project area were developed using vegetation type, density of vegetation, vertical structure of vegetation, aspect, elevation, and slope.

In general the existing fuel profile in the lower elevations within the Indian Soda project area represents a moderate to high resistance to control under average climatic conditions. Within the Indian Soda project area approximately 56% of the BLM acres have a moderate fuel hazard rating and 33% have a high fuel hazard rating. Most of the timber stands have a dense over story, a moderate amount of ground fuel and ladder fuels present. This creates optimal conditions for the occurrence of crown fires which could result in large stand replacement fires. This type of fire also presents an extreme safety hazard to suppression crews.

The fuel profile at the higher elevations within this watershed generally have a high amount of ground fuels which creates conditions conducive for stand replacement fires. Weather patterns generally limit these type of fires so resistance to control for most fires is low to moderate.

Air Quality

Smoke or pollutants have only been measured over the past three to four decades. The Clean Air Act directed the State of Oregon to meet the national ambient air quality standards by 1994. The Oregon Smoke Management Plan identified strategies to minimize the impacts of smoke from prescribed burning on smoke sensitive areas within western Oregon. Particulate matter the size of 10 microns (PM10) or less is the specific pollutant addressed in this strategy.

Currently the population centers of Grants Pass, and Medford/Ashland are in violation of the national ambient air quality standards for PM10 and are classified as nonattainment areas for this pollutant. The nonattainment status of these areas is not attributable to prescribed burning. Major sources of particulate matter within the Medford/Ashland

area is smoke from woodstoves (63%), dust and industrial sources (18%). Prescribed burning contributes less than 4% of the annual total.

The goal of the Oregon Smoke Management Plan is to reduce particulate matter emissions from prescribed burning by 50% by the year 2000 for all of western Oregon. Particulate matter has been reduced by 42% since the baseline period (1991). Emissions from wildfires are significantly higher than from prescribed burning. The wildfires which occurred in southern Oregon in 1987 emitted as much particulate matter as all the burning that occurred within the state that year. Prescribed burning under spring-like conditions consume less of the larger fuels creating fewer emissions, with smoke dispersal easier to achieve due to the general weather conditions that occur at this time of year. The use of aerial ignition reduces the total emissions by accelerating the ignition period and reducing the total combustion process due to the reduction of time in the smoldering stage.

The effect of smoke produced from prescribed burning could reduce visibility within the project area or could concentrate the smoke around the project site or surrounding drainages. Prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan and the Visibility Protection Plan.

E. LAND USE AUTHORIZATIONS - MINING/RIGHTS-OF-WAY

No mining claims have been identified in the project area.

Pacific Power and Light has a power line right-of-way (ORE 02890) in the NW $\frac{1}{4}$ of Section 17, T. 37S., R. 3E. W.M.

Ralph Wehinger has a right-of-way (OR 1612) for a water development in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ of Section 18, T.37S.,R.3E., W.M. He has a water right to use water from South Fork Little Butte Creek.

Ralph Wehinger holds a lease (OR 47750) for the International Wildlife Recovery Center in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ of Section 18, T.37S.,R.3E., W.M. This facility is now complete and ready to respond to spills or other events which threatens wildlife species.

The Bureau of Reclamation has a right-of-way (ORE 06714) for an irrigation canal in the N $\frac{1}{2}$ SW $\frac{1}{4}$ of Section 9, T.38S.,R.3E., W.M.

F. FOSSILS

A known leaf fossil site has been identified in Section 19, adjacent to BLM Road 37-3E-18.3, T. 37S.,R.3E., W.M. The fossil leaves are in volcanic ash from the Oligocene Epoch (26-37 million years ago).

G. RECREATION

There are no developed recreation sites within the project area. Recreation activities are in the form of dispersed recreation with the major activities being driving for pleasure, sightseeing, hunting, fishing, camping, target practice, mountain biking, horseback riding, off highway vehicle use, hiking, mushroom and firewood gathering, snowplay, Christmas tree cutting, and fossil gathering.

H. HOLE-IN-THE-ROCK Area of Critical Environmental Concern (ACEC)

The natural arches of "Hole-in-the-Rock" are the only documented geomorphic feature of this type in southern Oregon and northern California within the Cascades. There are natural arches on the coast caused by wave erosion and arches in basalt east of the Cascades caused by collapsed lava tubes.

Inquiry of other state and federal agencies found that the only other known arch in southern Oregon is near Lost Creek Lake at Needle Rock. Needle Rock is not nearly as large as “Hole-in-the-Rock” and it is really a hole caused by rocks falling against one another. The large size of Hole-in-Rock arch, excellent form, close proximity for public access, and scenic setting makes this area one of the best representative sites for natural arches on public lands. The size of this ACEC is approximately 63 acres.

I. SOILS AND WATER

Analysis Area

The Indian-Soda project area lies within the Little Butte Creek 5th Field Watershed. This watershed includes all the lands which provide runoff draining into Little Butte Creek and its tributaries. The Little Butte Creek Watershed is divided into smaller sub-watersheds, which are further divided into drainage areas. The South Fork and North Fork of Little Butte Creek have been identified as a Tier 1 Key Watershed. Key watersheds are crucial for maintaining and recovering habitat for at risk fish species. This analysis would focus on the current conditions of the individual drainage areas within the Indian-Soda project area. The impact management actions would have on these drainage areas, the key watershed, and the larger 5th Field watershed would be discussed in Chapter 4.

The Indian-Soda project area lies mostly within the Lower South Fork Little Butte Creek Subwatershed. This subwatershed includes all the lands which provide runoff draining into the South Fork of Little Butte Creek from below the confluence of Grizzly Creek to above the confluence with the North Fork of Little Butte Creek. A very small portion of the project area is also in the Dead Indian Creek Subwatershed.

The Indian-Soda project area contains two complete drainage areas, most of a third, and smaller parts of five others. The eight drainage areas are described below:

1) LB0524 South Fork Little Butte: includes all lands which provide runoff draining into the South Fork of Little Butte Creek from below its confluence with Dead Indian Creek to above its confluence with Grizzly Creek. This drainage area is part of the Dead Indian Creek Subwatershed. Only a very small portion of this drainage area is included in the Indian-Soda project area. There are no perennial or intermittent streams in this portion.

2) LB0603 South Fork Little Butte: includes all lands which provide runoff draining into the South Fork of Little Butte Creek from below its confluence with Grizzly Creek down to and including a small unnamed tributary near the FS/BLM boundary. Only a small portion of this drainage area is included in the Indian-Soda project area. A short segment of the South Fork of Little Butte Creek (perennial), and a short segment of one intermittent tributary are in this portion.

3) LB0606 South Fork Little Butte: includes all lands which provide runoff draining into the South Fork of Little Butte Creek from below its confluence with the small unnamed tributary near the FS/BLM boundary to above its confluence with Soda Creek. The only part of this drainage area which is included in the Indian-Soda project area is the portion south of the South Fork Little Butte Creek Road. This includes the mainstem of the South Fork of Little Butte Creek (perennial), and a few small intermittent tributaries.

4) LB0609 East Fork Soda Creek: includes all lands which provide runoff draining into the East Fork of Soda Creek from its headwaters down to the confluence with the West Fork of Soda Creek. The headwaters area is part of the Dead Indian Plateau. This area is flat to gently sloping until the stream system runs over the edge of the plateau and becomes confined within a high gradient canyon with extremely steep sideslopes. The main stem stream is perennial with most tributaries being intermittent. Most of this drainage area is within the Indian-Soda project area, except for the far eastern portion in Sections 21, 28, and 33.

5) LB0612 West Fork Soda Creek: includes all lands which provide runoff draining into the West Fork of Soda Creek from its headwaters down to the confluence with the East Fork of Soda Creek. Shortly above its confluence with the East Fork, the West Fork of Soda Creek splits into two main perennial streams which flow parallel to each other from the headwaters of the drainage area. The headwaters are part of a high plateau and are gently sloping until the streams flow over the edge and become more confined by increased gradients and steep side slopes. Most of the tributaries are intermittent streams. All of this drainage area is within the Indian-Soda project area.

6) LB0615 Soda Creek: includes all lands which provide runoff draining into Soda Creek below the confluence with the East and West Forks of Soda Creek and above the confluence with the South Fork of Little Butte Creek. Much of this drainage area has extremely steep topography. Soda Creek has a high gradient at the upper end of the drainage area and gradually flattens out as it approaches the South Fork of Little Butte. The main stem of Soda Creek is a perennial stream with most of its tributaries being intermittent streams draining very steep sideslopes. A major tributary enters Soda Creek a little over a quarter mile above its mouth. This stream parallels Soda Creek about a half mile to the west and has portions of perennial water, but the majority of the reach is an intermittent stream. All of this drainage area is within the Indian-Soda project area.

7) LB0618 South Fork Little Butte: includes all lands which provide runoff draining into the South Fork of Little Butte Creek from below its confluence with Soda Creek to above its confluence with Deer Creek. The only part of this drainage area which is included in the Indian-Soda project area is the portion south of the South Fork Little Butte Creek Road. This includes the main stem of the South Fork of Little Butte Creek (perennial), and a few small intermittent tributaries.

8) LB0627 Lost Creek: includes all lands which provide runoff draining into Lost Creek from its headwaters to above the outlet of Lost Lake. Only a very small portion of this drainage area is included in the Indian-Soda project area. This portion includes two small perennial streams in Section 6.

Table 5: Key Drainage Area Data*

Drainage Area (DA)	Total Public & Private Area (Acres)	% of DA within the project area	% of project area affected by proposed action	% of project area within Transient Snow Zone	Road Density (total miles/sq. mile)	# of stream crossings within the project area
LB0524	1542	4	1.5	87	2.9	0
LB0603	1142	14	10.4	11	0.7	1
LB0606	1715	20	4.9	0.2	1.5	3
LB0609	3749	74	6.9	89	4.0	43
LB0612	1751	100	27.9	79	6.4	36
LB0615	1579	100	39.3	17	3.7	13
LB0618	891	42	13.3	0	3.1	11
LB0627	4279	5	1.7	93	4.7	2

* GIS Data - Includes public and private lands.

Water Uses

The Little Butte Watershed Analysis (LBWA 1997) states beneficial uses of water in the Little Butte Watershed include domestic water supply, irrigation, livestock watering, cold water fish, other aquatic life, wildlife, recreation, and aesthetics. These uses are also valid within the Indian-Soda Project Area.

Water Quality

The South Fork of Little Butte Creek and some of its tributaries have been identified by Oregon Department of Environmental Quality (ODEQ) as water quality limited under Section 303(d) of the Clean Water Act.

From its mouth to Beaver Dam Creek, South Fork of Little Butte Creek is water quality limited due to flow modification, habitat modification, sediment, and summer temperature. Soda Creek is listed as water quality limited for sediment and it exceeds the maximum 7-day average for temperature ($>64^{\circ}\text{F}$). Temperature monitors placed in five locations during the summer of 1998 found water temperatures ranged from $64.3 - 74.1^{\circ}\text{F}$ in July and August. One monitor placed near the mouth of Soda Creek in 1999 recorded a maximum seven day average of 65.8°F .

Streamflow Regime

Streamflow in the Little Butte Creek Watershed fluctuates with seasonal variation of precipitation. The project area is characterized by mild, wet winters and hot, dry summers. Average annual precipitation ranges from approximately 38 inches at the lower elevations to 48 inches at the higher elevations. Winter precipitation in the higher elevations usually occurs as snow, which normally melts between April and June. In the lower elevations precipitation mostly falls as rain with the majority occurring in the late fall, winter, and early spring. Moderate to high flows generally occur from mid-November through May. Streamflows during the months of April and May and part of June are augmented by melting snowpack in the high elevations. The South Fork of Little Butte Creek normally experiences low flows which coincide with the period of low precipitation from July through September, and maximum peak flows generally occur in December. (LBWA 1997)

High flows are often the result of rain-on-snow storm events that occur when a substantial amount of rain falls on snow accumulated in the transient snow zone (elevation zone of 3,500 to 5,000 feet). The snow level in this zone fluctuates throughout the winter in response to alternating warm and cold fronts. The combination of heavy rain and rapid snowmelt can result in flooding. The transient snow zone occupies 31% of the Little Butte Creek Watershed, 47% of the South Fork Little Butte Subwatershed, and 61% of the Indian-Soda Project Area. (LBWA 1997)

Upland disturbances can increase the magnitude and frequency of peak flows. This may result in accelerated streambank erosion, channel widening, scouring and deposition of stream beds, landslides, and increased sediment transport. These are normal occurrences in a naturally functioning stream system. However, increases in peak flows due to human caused factors can greatly magnify the effects. For the Indian-Soda Project Area, the primary human caused disturbances which can potentially affect the timing and magnitude of peak flows include roads, soil compaction, and vegetation removal.

Roads collect surface water runoff and intercept subsurface water. This water is quickly transported from the roads to streams. A road-altered stream network may cause peak flows to increase in magnitude and change the timing of runoff entering the streams. This is more pronounced in areas with high road densities and where roads are in close proximity to streams. GIS data shows 49 miles of road within the project area with 109 stream crossings. The road density for the entire project area is 4.3 miles of road per square mile. A road density greater than 4.0 miles per square mile is considered high.

Table 6: Road Data*

Analysis Area	Total Road Miles	Road Density (miles/sq. mile)	Stream Crossings #
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5 th Field Watershed	1114.3	3.0	2486
Key Watershed	636.7	3.2	1247
Indian Soda	49.1	4.3	109

* GIS Data - Includes public and private lands.

Soil compaction caused by roads, timber harvest activities, and grazing affects the hydrologic efficiency within a watershed by reducing infiltration rates and causes more precipitation to quickly enter streams as runoff instead of slowly percolating through the soil to the streams. Soil compaction data has not been collected for the Little Butte Creek Watershed. However, soil compaction would be analyzed at the project level in Chapter 4.

Vegetation removal reduces interception and transpiration which allows more precipitation to reach the soil surface and infiltrate or become runoff. The increased runoff and soil moisture can increase peak stream flows. Large areas of vegetation removal in the transient snow zone may result in an increase in snowpack accumulation which can quickly melt during a rain-on-snow event and may result in extremely high streamflows. Once vegetation is removed, it is considered to be hydrologically unrecovered until new vegetation obtains the same crown closure as the previous unmanaged stand. According to the Little Butte Creek Watershed Analysis, Douglas-fir and white fir stands are considered to be 100 percent hydrologically recovered when they obtain a crown closure of 70 percent, and pine stands are fully recovered at about 40 percent. These canopy closure percentages reflect reference conditions when natural disturbances were more frequent. The range of natural variability includes canopy closures that would be greater than and less than full hydrologic recovery.

The hydrologic recovery of the Indian Soda area is shown below. This data was calculated by applying recovery factors to the vegetation information derived from Western Oregon Digital Image Processing satellite imagery data. This analysis is similar to that done in the Little Butte Creek Watershed Analysis. The satellite imagery data is only available in 10 percent increments, starting at 5 percent, so full recovery had to be taken at 75% instead of 70%. The satellite data does not have the capability of distinguishing between tree series so pine stands had to be treated the same as Douglas-fir. Therefore, the percent hydrologic recovery shown below is a conservative estimate. Areas classified as water, rock, and grassland/shrubland are considered fully recovered for this analysis. Urban/agricultural areas are 0 percent recovered.

Table 7: Hydrologic Recovery

Analysis Area	Percent of Area Hydrologically Recovered	
	All Lands	Transient Snow Zone
5 th Field Watershed	65	75
Key Watershed	73	78
Indian Soda	77	73

Stream Channel Morphology

There are three general geomorphic landforms within the Indian-Soda project area. These landforms greatly influence the stream channel morphology of the stream systems which flow through them. The three landforms are valley floor, canyon sideslopes, and the lava plateau. (LBWA 1997)

The valley floor landform is found in the lower elevations, 1300 to 3200 feet, and is very smooth and gently sloping with predominantly stable slopes with slight to moderate erosion potential. The predominant stream type in this area is

a Rosgen C type stream. C type streams typically have a broad valley with a well developed flood plain. These streams have gentle gradients and are usually quite sinuous. The streambanks are susceptible to accelerated erosion because streambanks usually contain finer materials than the channel bottom. The rates of erosion are controlled by the presence and condition of riparian vegetation.

The canyon sideslopes landform is found in middle elevations, 2200 to 5300 feet, and is steep to moderately steep with highly dissected terrain. The slopes are unstable to moderately stable with high erosion potential. Landsliding and erosion are common and have helped form the present shape of this area. The predominant stream types in this area are Rosgen A and B type streams. These streams are higher gradient and are well confined between narrow stream valleys with little or no floodplain. B type streams are considered to be quite stable. The even higher gradient A type streams are high energy streams and stable if controlled by bedrock or boulder. Many of the A type streams in the project area are dominated by cobbles and gravel which are generally unstable and have high sediment transport rates. These streams are usually located in landforms with a lot of slump and earthflow processes. These processes occur naturally within the Indian-Soda project area.

The lava plateau landform is found in the higher elevations, 4400 to 6000 feet, and is fairly smooth and gently sloping. This area is commonly referred to as the Dead Indian Plateau. This area has stable slopes with slight to moderate erosion potential. Stream types in this area are predominately Rosgen E type streams flowing through meadows. E type streams have very wide, well developed flood plains and are typically very stable, however heavy grazing pressure within the project area has resulted in a loss of riparian vegetation and bank erosion and down cutting has taken place.

There are two major stream systems within the project area. They are Soda Creek and the South Fork of Little Butte Creek. Soda Creek drains through all three of the general geomorphic landforms. Much of the main stem stream channel through the canyon sideslope area has high amounts of bedrock, boulder, or cobble which helps stabilize the stream system. However, erosion in the headwaters, as well as natural and human caused landslides have increased the amounts of finer materials. The South Fork of Little Butte Creek flows through the valley floor landform. Much of the stream below the project area is on private land.

Soils

The soils in the project area formed from material weathered from igneous rock on plateaus and hillslopes. The topography ranges from 5 percent to near 60 percent slopes. The soils series identified in the project area are Bybee, Farva, McMullin, McNull, Medco, Tatouche and Woodseye. The Bybee, McNull, Medco, and Tatouche soils have montmorillonitic mineralogy which causes these soils to have high shrink-swell potential and are subject to severe compaction. The Farva, McMullin and Woodseye soils have high rock content and/or are shallow in depth which limits moisture holding capacity. The Bybee and Medco soils have perched water tables December through May. The following table list the soil characteristics of respective soil series. A map showing the location of these soils on the landscape is on file at the Medford BLM office.

Table 8: Soils in the Project Area

MapUnit #	Soil Series Name	Soil Depth	Surface Texture	Subsoil Texture(s)
18	Bybee	60"+	loam	clay
56/58	Farva	20-40"	very cobbly loam	cobbly loam
110/113/117	McMullin	<20"	gravelly loam	gravelly clay loam
114/115/117/119	McNull	40-60"	clay loam	cobbly clay

119/123/124	Medco	20-40"	cobbly clay loam	clay
19/20/190/191	Tatouche	60"+	gravelly loam	clay
207	Woodseye	<20"	very stoney loam	very cobbly loam

CHAPTER 4 Environmental Consequences

INTRODUCTION

This chapter forms the scientific and analytic basis for comparison of alternatives. Discussions include the environmental impacts of the alternatives and any adverse environmental effects which cannot be avoided should the proposal be implemented. It also identifies and analyzes mitigation measures, if any, which may be taken to avoid or reduce projected impacts.

The impact analysis addresses direct, indirect, and cumulative impacts on all affected resources of the human environment, including critical elements.

MITIGATION MEASURE

A Mitigation Measure for the Indian-Soda EA is to eliminate the proposed 1.1 miles of road construction. Approximately 130 acres of matrix commercial forest land is affected by this proposal. Analysis of the impacts of *not* constructing the road are below.

1. Logging Systems

Estimated road construction cost including surfacing is \$40,000. If this mitigating measure is accepted, the timber available for harvest on the 130 acres of land adjacent to this proposed road would be logged using a helicopter system instead of a cable logging system. This change in logging systems would result in an increase in yarding cost ranging from \$184/MBF to \$268/MBF. This would be an increase in logging cost ranging from \$239,200 to \$696,800 for this project. Cost would increase from \$925,704 to \$1,348,308 for the existing standing volume to be regeneration harvested. Projecting for future entries, this translated to a total reduction in receipts of \$885,000 to \$1,300,000.

2. Aquatic

Constructing this road is not expected to directly contribute sediment to the system. The road densities in this watershed are near the upper limit recommended by the Little Butte Watershed Analysis.

3. Fuels

Impacts would be equivalent to implementing the No Action Alternative for the land adjacent (approx. 130 acres) to the proposed road.

4. Wildlife

The one mile of road construction that would occur under Alternative I would eliminate approximately 6 acres of the various habitat types present in the project area. Given the scale of the project, however, the quantity of habitat loss would be negligible. The greater impact of the road construction on wildlife would be associated with the long-term vehicular disturbance that could occur if the roads remain open to use after harvest or if the proposed barricades/gates are breached on a regular basis.

The majority of the project area has high road densities which are currently greater than 4 miles of road per square mile (Little Butte Creek Watershed Analysis, 1997). This has detrimental effects on some species of wildlife through fragmentation of habitat and increased disturbance. To help offset these effects, 5 miles of existing roads are planned to be decommissioned in this project.

The majority of the Indian Soda project area has high road densities which are currently greater than the 4 miles of road per square mile recommended by the Little Butte Creek Watershed Analysis, 1997. It would be beneficial to wildlife to mitigate the effects of existing high road densities in the Little Butte Creek watershed by not constructing any new roads in this project. High road density has detrimental effects on some species of wildlife through fragmentation of habitat and increased disturbance.

5. Fisheries/Hydrology/Soils

Choosing not to build this road would slightly improve road densities in the watershed.

A. VEGETATION, DIRECT AND INDIRECT EFFECTS

1. Forestry Proposed Action Alternative, Variable Prescriptions

The prescriptions proposed to be applied across the forest landscape are based upon the present vegetation structure, species composition, aspect, and vegetation condition class. The main objectives are to create old-growth forest stand structure, and to maintain the desired tree series over time. Through forest stand treatments tree densities are reduced thus allowing for improved individual tree vigor and growth, and improved forest health. Table 2 of the silvicultural prescription shows projected 20-year diameter growth for treated and untreated stands (projections from the southwest Oregon ORGANON growth analysis model). Table 4 of the silvicultural prescription shows the growth of one mid seral and one mature stand with and without management. In both unthinned stands hundreds of trees per acre are lost through natural mortality. After the same stands are thinned to specified levels, little natural mortality occurs (See Silvicultural Prescription, Table 3).

The silvicultural prescription (Table 2) shows that 10-year diameter growth would exceed 2.5 inches if the stands are treated as proposed. The remaining trees would be vigorous enough to withstand bark beetle attacks. This is important for retention of old-growth trees in the forest stands.

With the group selection prescription, pine species would be favored for retention to increase their prevalence in the forest stands, and to decrease the infection level of Douglas-fir dwarf mistletoe at the stand level.

The objective of the Douglas-fir dwarf mistletoe prescription is to manage the location of the parasite over a very long period of time. With treatment the rate of infection would most likely decrease with time.

The various prescriptions meet the specifications of restoration thinning and density management as outlined in the Medford District Resource Management Plan.

1. Forestry No Action Alternative

No action would allow forest stands to remain overstocked and individual tree vigor and growth would remain in decline. Dominant tree 10-year radial growth is 0.70 inches or 1.40 inches diameter growth per decade in the Indian Soda project area. Average dominant tree 10-year radial growth ranged from 0.15 to 2.5 inches. When diameter growth is less than 1.0 inch per decade, pine trees cannot pitch-out bark beetles and tree mortality results (Dolph, 1985). Tree mortality represents a reduction in stand volume production and loss of revenue, and poor tree vigor.

Trees with poor vigor ratings may succumb to bark beetle attacks of relatively low intensity (see Chapter 3, for the

explanation of Waring's (1980) tree vigor index rating).

Without action, forest structure and species composition could not be regulated. On pine sites, Douglas-fir and white fir would remain the most prevalent species and stands would remain in the stem exclusion stage of development (approximately 30 to 50 years). Old-growth ponderosa pine and Douglas-fir trees with seedlings through poles within their dripline would continue to die from competition for water. Ponderosa and sugar pines would continue to decline in number from competition with Douglas-fir because of their shade intolerance. With large tree mortality, forest stand structure would continue to shift to the understory reinitiation stage.

No action contradicts the Medford District Resource Management Plan and the Little Butte Creek Watershed Analysis forest condition objectives in regard to forest health. The plans state that management emphasis be placed on treatments and harvests that restore stand conditions and ecosystem productivity.

2. Special Status Vascular Plants Proposed Action Alternative

This alternative would have detrimental effects on species that require closed canopy conifer forests, such as *Cypripedium fasciculatum* and *Cypripedium montanum*. While these species would be protected by reserve areas, surrounding habitat degradation would serve to isolate these populations. However, short term adverse effects on habitat structure and composition may bring about long term benefits to habitat quality. Generally, these species have a very slow dispersal process. Removing suitable habitat could have adverse effects on species population viability.

Cimicifuga elata could benefit from thinning the forest canopy. Habitat requirements for this plant are open forests and openings in forest canopies. While this alternative may provide habitat benefits, long term monitoring examining these questions is only in its second year.

Opening of the forest canopy, disturbance to the organic litter layer (including the mycelial layer), disturbance to the remaining conifer boles, and disturbance of coarse woody debris would all have adverse effects on S&M species. Even though there is a lack of knowledge for many of these species, they are included on the S&M list for their close association with late-successional, old-growth forests. Long term effects may be beneficial.

Cheilanthes intertexta, *Perideridia howellii*, and *Ribes inerme* var. *klamathense* would be unaffected by this alternative. These plants are located in rock or riparian reserves and are found in a wide range of canopy closures.

2. Special Status Vascular Plants No Action Alternative

The no action alternative would continue the habitat degradation of fire maintained communities. The symptoms of overly dense understories and overstories, less biodiversity, and increased insects and diseases would be maintained. Also, continued fire suppression would result in the retardation and probable alteration of expected pre-Euroamerican plant succession. This alternative would increase the possibility of an extensive and intense fire occurring which would return the area to an early seral community.

For many of the S&M species, population protection is through reserve areas where no management action is allowed. Until more species information is acquired, maintaining current habitat conditions should be considered a benefit. Maintaining unoccupied habitat would allow for dispersal and recruitment.

B. WILDLIFE, DIRECT AND INDIRECT EFFECTS

Proposed Action Alternative

The general effects of timber harvest and fire management activities on wildlife/wildlife habitat are discussed in BLM Medford District Resource Management Plan, October 1994 Chapter 4, pages 51-65. The effects that are more site/drainage area specific are addressed further in the following discussion.

In order to accomplish the objectives that have been established for Alternative I, existing habitat conditions would be modified on approximately 1,775 acres of commercial forest land. Due to the variety of conifer stand conditions in the project area, there are numerous prescriptions/marketing guidelines, most with a primary goal of improving tree/stand vigor and growth. The treatments and the logging operations, however, would reduce canopy closure, which is an important stand feature for a number of the wildlife species (e.g., northern spotted owl) associated with mid and late-successional conifer stands. This would adversely affect these species. Conversely, species preferring or adaptable to open canopies and/or early seral conditions, e.g., great horned owl and mountain quail, respectively, would benefit from the harvest since a reduction in canopy closure would stimulate growth of herbaceous and other early seral vegetation.

Treatments designed to open the canopy of ponderosa pine stands would benefit some wildlife species by restoring these stands to historic habitat conditions.

1. Threatened/Endangered Species, Northern Spotted Owl Proposed Action Alternative

The northern spotted owl is listed as a threatened species under the auspices of the Endangered Species Act of 1973, as amended. Due to habitat modification that would occur under Alternative I, BLM is required to formally consult with the U.S. Fish and Wildlife Service because the proposed actions would adversely affect northern spotted owls.

Alternative I would modify approximately 1,775 acres of suitable northern spotted owl habitat (i.e., nesting/roosting/foraging habitat). The effects of Alternative I on northern spotted owl habitat are summarized in the following table:

Effects of Alternative I on Northern Spotted Owl Habitat			
Existing Suitable habitat	Remains Suitable Habitat	Moves to Dispersal Habitat	Loss of Suitable Habitat
3,275 ac	1,500 ac (46%)	1,091 ac (33%)	684 ac (21%)

The habitat loss described above is expected to adversely affect the ability of spotted owls within and adjacent (within 1.2 miles) to the project area to successfully reproduce. Formal consultation with the U.S. Fish and Wildlife Service has been completed for timber sales in the project area that would be sold in fiscal years 1999 and 2000 [Biological Opinion 1-7-98-F-321 (BO)]. The mandatory terms and conditions of the BO require the implementation of project design criteria proposed in the Biological Assessment for Rogue River/South Coast FY 99/00 Timber Sale Projects (BA). These criteria would be incorporated in the design of the timber sales.

Northern Spotted Owl Critical Habitat Unit (CHU)

Approximately 4,992 acres of the Indian Soda project area are in CHU OR-37. The majority of this CHU (80%), is encompassed within the adjacent Dead Indian Late Successional Reserve (LSR) to the east within the Rogue River and Winema National Forests. This CHU provides the single most important link connecting the Oregon Cascades Province to the Klamath Mountains Province across the south Ashland portion of the I-5 Area of Concern. By straddling the crest this unit provides an important east-west connectivity for the southern Oregon Cascades. This CHU also provides the only link to the north in the Oregon Cascades, and is the key link from Oregon to California south of Highway 66.

Within the Indian Soda project portion of the CHU, approximately 3,190 acres provide suitable habitat (nesting/roosting/foraging) for northern spotted owls, and 265 acres provide dispersal-only habitat. Under Alternative I, approximately 1,738 acres of suitable habitat would be harvested using prescriptions of variable intensity. The following table shows the effects of Alternative I on northern spotted owl habitat within CHU OR-37:

Effects of Alternative I on Northern Spotted Owl Habitat Within Critical Habitat Unit CHU OR-37			
Existing Suitable Habitat	Remains Suitable Habitat	Moves to Dispersal Habitat	Loss of Suitable Habitat
3,190 ac	1,452 ac (46%)	1,054 ac (33%)	684 ac (21%)
Existing Dispersal Habitat	Remains Dispersal Habitat		Loss of Dispersal Habitat
265 ac	265 ac (100%)		None

When designated as critical habitat in 1992, the proposed function of CHU OR-37 was to maintain adequate nesting, roosting, and foraging habitat to improve connectivity between other CHUs. Alternative I would have a detrimental effect on this proposed function of the CHU due to the removal of suitable habitat. However, in the Biological Opinion for the Northwest Forest Plan, the U.S. Fish and Wildlife Service concluded that the combination of land allocations and prescriptions in the plan should enable the critical habitat network to perform the biological function for which it was designated even though the LSR network did not completely overlay the CHU network. Given this, the apparent primary function of critical habitat outside of LSRs, is to help provide the necessary dispersal/connectivity between LSRs. The silvicultural prescriptions for mistletoe and pine treatments would potentially render approximately 684 acres of suitable habitat in the CHU too open for dispersal which would adversely affect the dispersal function of the CHU.

2. Special Status Species Proposed Action Alternative

Special Status Species (SSS) are those species that are federally listed as endangered (FE), threatened (FT), proposed (FP), or candidate (FC), or that the Oregon State Office of BLM (OSO) lists as sensitive (BS) or assessment species (BA). The OSO also maintains a list of "tracking" species as part of the SSS program, but for management purposes these species are not considered to be SSS (Special Status Species Policy for Oregon and Washington, 1991).

The following are SSS known to be present in the project area and would be adversely affected by the proposed projects: northern spotted owl (FT), , long-legged myotis (BS), fringed myotis (BS), Yuma myotis (BS), western bluebird (BA), pileated woodpecker (BA), and great gray owl (BA).

All species would be adversely affected due to the overall change in stand structure, specifically the reduction in canopy closure and/or snag density in the mixed conifer plant community. All of the species would be affected in their ability to feed, breed, and shelter. The Northwest Forest Plan, however, provides some degree of site specific mitigation for these species through the implementation of appropriate Standards and Guidelines. Impacts to the bat species would be mitigated by the retention of most snags. Impacts to northern spotted owls and great gray owls would be mitigated by the retention of core areas around nest sites/activity centers. Retention of snags would also mitigate impacts to western bluebirds.

Indirect effects associated with the proposed project, such as site preparation or planting, would have only minor impacts on wildlife because these actions would occur in areas already disturbed by the major actions (i.e., timber harvest treatment).

No Action Alternative

Since no projects are planned under this alternative, disturbances and vegetative succession would occur without the impact from forest management activities (except for fire suppression), and wildlife populations and distributions would change in response to these processes. Exclusion of natural fire regimes across the landscape would continue the trend toward loss of some plant communities within open pine, oak woodlands, and grasslands. This alternative would continue to facilitate a high fire-hazard.

C. AQUATIC/RIPARIAN, DIRECT AND INDIRECT EFFECTS

The Aquatic Conservation Strategy (ACS) was developed to restore and maintain ecological health of watersheds and aquatic ecosystems on public lands. The strategy protects salmon, and steelhead habitat on federal lands managed by the Forest Service and Bureau of Land Management within the range of Pacific Ocean anadromous species. For a detailed analysis of the ACS objectives see Appendix C.

1. Threatened and Endangered Fish (Coho Salmon) Proposed Action Alternative

The action alternative is “Not Likely to Adversely Affect” (NLAA) coho salmon. It would have less than a negligible probability of “take¹⁸” of coho. It would not harm¹⁹ fish or otherwise impact coho critical habitat. Possible short-term sediment impacts from activities included in the Indian Soda Project (e.g. road decommissioning, culvert removal) are not sufficient to cause a “taking” of coho.

This project has been consulted upon with the National Marine Fisheries Service. It was included in the Rogue/South Coast Biological Analysis of April, 2000.

¹⁸ “Take” is a legal term. In the Endangered Species Act (Section 3), “take” is defined as “to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct.”

¹⁹ The US Fish and Wildlife Service further defines “harm” as “significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering.”

2. Aquatic/Riparian Proposed Action Alternative

Culvert repair, replacement, and removal occurring within the project area would initially contribute fine sediment to the system due to the instream nature of this work. Overall, the system would benefit from these actions because sediment from erosion would be reduced and fish passage would be restored. To further mitigate possible short-term negative effects of these actions, a seasonal restriction would allow this work only during the dry season when increased sedimentation would not affect incubating eggs.

Blocking, decommissioning, and/or improving road drainage on roads within Riparian Reserves may briefly increase fine sediment input to the system. These actions however, are expected to reduce road-caused sedimentation over the longterm and allow riparian vegetation to recolonize the decommissioned and blocked road surfaces. As trees grow up in the road bed, their roots loosen the compacted soil, restoring groundwater flow, thus improving the humid character of the riparian area. These trees also contribute organic material to the streams, provide shade, and increase potential large wood for eventual instream complexity.

New road construction is not expected to contribute sediment to the system given the soil stability of the area, distance of road from stream, and current road building standards.

A riparian area and a meadow/spring have been identified for exclusion fencing to keep cows out. These areas have been cattle loafing areas in the past and would benefit from this action. Fencing would keep cows off the banks and out of the spring headwaters allowing riparian vegetation to reestablish and decrease bank sloughing and sedimentation.

Several riparian areas in the drainage might benefit from large wood placement but such activities are not planned at this time because large wood recruitment into this drainage would improve over time, naturally. Large wood in streams is by nature dynamic and we can expect logs in tributaries to move downstream during various winter high-flow conditions. Precommercial thinning within some sections of riparian reserve would promote growth, allowing trees to attain late-successional characteristics sooner, and in some cases the vegetation would become more structurally diverse.

Reintroducing fire to some sections of the Riparian Reserve is expected to have a positive effect by enhancing stand structure and diversity while reducing fuel levels.

Aquatic/Riparian No Action Alternative

In the No Action alternative, road building, road decommissioning, or stream crossing improvements would not take place in Riparian Reserves or in surrounding uplands. Therefore, there would be no direct effects. Indirect effects would consist of continuing current condition trends for watershed cumulative effects brought on by past activities in the watershed. There would be no change in current condition trends in Riparian Reserves or fish habitat. Sediment input and Riparian Reserve problems would remain the same.

D. FUELS, DIRECT AND INDIRECT EFFECTS

Proposed Action Alternative

In the short term (10-25 years) logging would create surface fuels which would be greater in most areas than current levels if they are not treated. Fuel amounts are measured in tons per acre for different size material. It is anticipated

that fuel loadings after logging would be increased by approximately 3-15 tons to the acre. This would change the existing fuel model of most of the timbered stands which in some cases higher rates of spread and greater flame lengths would occur. Direct attack of a fire would be limited under some weather conditions so indirect measures would have to be taken. This would in turn increase the size and cost of a wildfire.

Logging slash, if not treated, would also increase the duration and intensity of a ground fire. Material up to 3 inches in diameter has the greatest influence on the rate of spread and flame length of a fire, which has direct impacts on fire suppression efforts. This would cause increased mortality to the smaller diameter overstory trees. To mitigate the impacts of residual logging slash on the fuel hazard of the harvest units, fuels would be treated on the majority of the acres harvested under this proposed project.

This alternative would reduce the overall density (aerial fuels), ladder fuels and surface fuels of the timber stands which are proposed for treatment. This in turn would reduce fire behavior such as flame length. By altering fire behavior, the duration of a fire and the amount of acres burned in high intensity fires would be reduced. This change in fire behavior would reduce the mortality of conifers in the event of a wildfire.

Prescribed burning is the only proposed management activity which could have a notable adverse effect on local and downwind air quality. Air quality of local communities could be impacted for brief periods of time due to prescribed burning. Prescribed burning under late fall, winter and early spring conditions consumes less of the larger fuels which creates fewer emissions. Smoke dispersal is easier to achieve due to the general weather conditions that occur at this time of year. The use of aerial ignition (helicopters) reduces the total emissions by accelerating the ignition period and reducing the total combustion process due to the reduction in the smoldering stage.

All burning would be done in accordance with the Oregon Smoke Management Plan which tries to prevent prescribed fire smoke from being carried to or accumulate in designated smoke-sensitive areas. This plan is in conformance with federal air quality and visibility requirements to protect public health and encourage the reduction of emissions.

No Action Alternative

The current trend of increasing stand density which results in increased mortality to the timbered stands would continue. Ladder and surface fuels would also increase within the stands. Increasing stand densities and fuel loadings would increase the chance of more acres that would burn in high intensity fires within the Indian Soda project area. Fire fighter safety would continue to be an issue as well as the potential of resource damage.

Air quality would be impacted in the event of a large wildfire. Emissions from wildfires are significantly higher than from prescribed burning.

E. HYDROLOGY/SOILS, DIRECT AND INDIRECT EFFECTS

1. Soils Proposed Action Alternative

Timber harvest and road building has the potential for increasing soil moisture and activating future landslides. There are some areas with past landslide and slumping activity within the planning area. However, slopes in the proposed units are generally stable and the landslide hazard is considered low to moderate. Areas of high landslide potential have been avoided or included in Riparian Reserves.

Soil compaction resulting from timber felling, yarding, and road building could reduce infiltration rates and increase the potential for erosion and sediment movement into streams. Compaction also reduces soil productivity and causes plants to grow slower than in non-compacted areas. All tree harvesting using tractors would be accomplished using designated skid trails resulting in the compaction of approximately 12 percent or less of the unit. Cable yarding compacts about 7 percent of a harvest unit. Helicopter yarding would result in much less soil disturbance with about 1 percent of a harvest unit compacted. For this project, if the highest impacting yarding system allowed for each unit is used (see Appendix A), the maximum amount of soil compaction which could occur within the harvest units is about 190 acres or 11 percent of the total harvest area. This is about 3 percent of the Indian Soda Area, 0.2 percent of the Key Watershed, and 0.08 percent of the 5th Field Watershed. Mulching, seeding, and placing slash on the skid roads would help reduce the potential for erosion and sediment movement.

2. Water Quality Proposed Action Alternative

Improperly designed and maintained roads are usually the main cause of stream sedimentation. The project area has a high existing road density. The proposed action would result in a decrease in road density.

About 50 miles of road renovation, maintenance, drainage improvement, and log hauling could cause a short term increase in stream sedimentation. Adverse effects would be localized, extending several hundred feet downstream of stream crossings and would last about one year. Road renovation, maintenance, and drainage improvement is intended to reduce actual and potential erosion, potential road failure, and the resulting stream sedimentation. Sedimentation would either decrease (improve) after the initial flush of sediment is dispersed, or be maintained at its existing level, depending on existing road and stream conditions. Overall, there should be a long term decrease (improvement) in stream sedimentation rates within the project area due to less roads, improved road drainage, and renovated existing roads.

The closing of 23 miles of road with gates and barricades would help reduce sediment input by restricting traffic use on those roads. This is especially important during the winter season when erosion potential and sediment production is highest, and would be greatly increased by road traffic. Therefore, closing these roads would result in a long term decrease in sediment production.

There would be a short term increase in soil movement along temporary spur roads, skid trails, and on cable yarding corridors before disturbed soils stabilize. However, locating temporary roads on or near ridges, decommissioning temporary roads, seeding, mulching, and water barring skid trails and the establishment of Riparian Reserves would reduce or prevent sediment from reaching streams.

The proposed construction of 1.1 miles of new permanent road might initially produce some sediment, but the new road would be located near the top of a ridge and away from any riparian areas. The new road would be surfaced with crushed rock, fill slopes would be seeded and mulched, and the road would be gated year round to restrict use. If the road is properly constructed there would probably be no adverse effect on the stream system below the road.

Conditions within the water quality limited streams should improve. The proposed action would not negatively affect the water quality limited streams due to the implementation of riparian reserves, project design features, and best management practices. The reduction in sediment delivery through road improvements and decommissioning should cause an overall reduction in stream sediment levels. It is unknown if this reduction would be enough to remove them from the 303d list. High road densities and naturally high levels of sedimentation would continue to contribute to the problem. It is unknown how long it would take for stream temperatures to return to within the accepted limits. This

project would have no effect on the South Fork of Little Butte Creek in terms of habitat modification or flow modification.

3. Stream Flow Regime Proposed Action Alternative

Decommissioning 5 miles of road would decrease road densities (from 4.3 miles per square mile to 4.0 miles per square mile) for the project area. The road density would remain unchanged at the Key Watershed and 5th Field Watershed level. The change in road densities would have little to no effect on peak flows compared to the current condition.

If a new road is constructed, the road density for the entire project area would decrease from 4.3 miles per square mile to 4.1 miles per square mile. The road density would increase in LB 0615 Drainage Area from 3.7 miles per square mile to 3.8 miles per square mile in the Lower Soda Creek Drainage Area. However, there would be no net increase in road density within the Key Watershed. Again, the change in road densities would have little to no effect on peak flows compared to the current condition.

Table 9: Project Effects on Road Density (miles/sq. mile)

Drainage Area	Before Project	After Project
LB 0609	4.0	3.8
LB 0612	6.4	5.7
LB 0615	3.7	3.3 w/o road, 3.8 with road
LB 0618	3.1	3.0
LB 0627	4.7	4.6
Indian-Soda	4.3	4.0 w/o road, 4.1 with road
Key Watershed	3.2	3.2
5 th Field Watershed	3.0	3.0

Soil compaction may result in a slight increase in surface runoff within individual harvest units. The spatial scattering of harvest units across the landscape should limit the effects of compaction to localized areas. The Lower Soda Creek and West Fork Soda Creek Drainage Areas may see some increases in runoff due to the higher percentage of harvest units. The existence of Riparian Reserves should help to capture and reduce potential runoff and filter any sediment it may be carrying. The resulting peak flows in the stream channels may increase slightly from existing conditions. The affects of increased peak flows would be discussed later in the Channel Morphology section.

Silvicultural treatments would occur on approximately 1775 acres within the project area. About 850 of these acres are located within the transient snow zone. A variety of silvicultural treatments are planned within the project area and even within harvest units. The resulting canopy closures would be variable across the project area. The table below shows the predicted effects of the project on hydrologic recovery in the transient snow zone.

Table 10: Project Effects on Hydrologic Recovery

Analysis Area	Percent of Area Hydrologically Recovered in the Transient Snow Zone	
	Before the Project	After the Project
Indian-Soda	73.0	64.2 to 69.2
Key Watershed	78.0	76.7 to 77.4
Little Butte Watershed	74.8	74.3 to 74.6

The prediction is based on the worst case scenario in which canopy closures within the harvest units would be reduced from full hydrologic recovery (70 percent canopy cover or greater) to between 60 and 40 percent. This project would result in a 4 to 9 percent decrease in the total hydrologically recovered area within the transient snow zone at the project level. The Key and 5th Field Watersheds would see a small to slight decrease. Even though hydrologic recovery would be reduced, about two-thirds of the transient snow zone within the project area would still be at full recovery. This would cause a slight to moderate increase in risk of a higher magnitude flow event occurring as the result of a rain-on-snow event. The increase in risk of such an event happening would be temporary; the highest increase in risk being immediately after the treatment, and then gradually reducing as the canopy recovers. The time required for recovery depends on many variables such as stand health and vigor. Most Douglas-fir stands in the Indian Soda project area should be able to recover from 40% canopy closure to full recovery at 70% within 15 years. From 60% canopy closure, most Douglas-fir stands should recover in about 5 years. Rain-on-snow events occur naturally and frequently within the project area. The majority of bankfull flows are associated with rain-on-snow events and have a return interval of 1.5 to 2 years. However, methods of timber harvest which create large openings, as opposed to methods which create smaller openings, can increase the magnitude of flows resulting from rain-on-snow events, especially major rain-on-snow events. Most new or renovated stream crossings are now designed to withstand a 100 year flow event. The probability of a 100 year flow event occurring within any given 15 years is about 1 in 7, and within 5 years is about 1 in 20. The resulting impact within the watershed depends on the condition of the streams. The majority of streams in the project area have the capability of withstanding the energies associated with a high flow event without severe degradation.

4. Channel Morphology Proposed Action Alternative

Compaction, high road densities, and vegetation removal in the transient snow zone could combine to increase peak flows more than the individual impact of each factor. The exact effect this would have on the stream channels is unknown. However, increased bank cutting, down cutting, and sediment delivery could occur if extreme increases in peak flow occur. Extreme increases are unlikely due to the spatial scattering of the treatment areas and the existence of Riparian Reserves which could act to buffer some of the increases in runoff. Most stream channels in the higher gradient portions of the project area have high amounts of bedrock, boulders, and cobbles which would help to dissipate high flow energies. Streams in the headwaters of Soda Creek have been impacted by historically heavy grazing pressure and other management practices. However, the relative flatness of this area should help to limit stream energy and the timing of any increased runoff.

No Action Alternative

No silvicultural treatments, road building, road decommissioning, road renovating, or stream crossing improvements would take place under this alternative. Therefore, there would be no direct effects.

Indirect effects would be the continuation of current watershed conditions and cumulative effects of past management within the project area. Road densities would remain at the present level. Unimproved roads with inadequate drainage structures would continue to direct increased runoff and sediment into streams.

Fire hazard would remain high to moderate throughout the project area. Increased fuel loading due to fire suppression could result in a much more severe wild fire than what commonly occurred under natural conditions. Such a fire could burn a large portion of the watershed which could cause severe erosion problems, mud slides, channel downcutting, sedimentation, and increased water temperatures.

CUMULATIVE EFFECTS

Cumulative effects are the collective environmental impacts of all past, present, and reasonably foreseeable future actions taking place in the affected area. For this analysis, the affected area is defined at three different spatial scales: project area (roughly Soda Creek watershed), Key watershed (North and South Forks Little Butte Creek) and the HUC-5 watershed (the entire Little Butte Creek watershed). Impacts of present and reasonably foreseeable future actions are analyzed in the short-term (0 - 10 years) and the long term (greater than 10 years). Past actions generally refer to those post-European settlement, for example, commercial timber harvest on public and private land, road construction, and agricultural development in the valley bottom. For a summary of the effects of past actions, see the Little Butte Creek Watershed Analysis. The present action is defined as the Indian Soda Project. Reasonably foreseeable future *federal* actions include only known upcoming BLM projects. For reasonably foreseeable private actions, BLM assumes that all private land would be clearcut.

Proposed Action (Indian Soda Project) Cumulative Effects

1. Summary of Ecological and Biological Criteria. Tables 11 and 12.

Table 11 summarizes the current conditions and desired future conditions for each criteria. For more detail on the current conditions, see Chapter 3 of this document. For more detail on desired future condition, see the Little Butte Creek Watershed Analysis. Table 12 summarizes the short and long term cumulative effects for the same ecological and biological criteria at the project, key watershed, and HUC-5 spatial scales. For additional cumulative effect data see Appendix C.

Table 11. Current and desired future conditions for landscape criteria for the Indian Soda Project Area.

Current Condition/Trend	Desired Management Action/Future Condition
Landscape-Level	
<u>Fragmentation</u> - The current landscape is highly fragmented because of past timber harvest practices, pasture creation, and road construction across private and public land. Short return-interval timber harvest practices are likely to continue on private land. Precommercial thinning and “thinning-from-below” would reduce fragmentation on public lands in the longer term by promoting growth of larger trees.	<u>Fragmentation</u> - Prevent further fragmentation of late seral conifer communities in the short-term. Reduce fragmentation of late seral conifer communities in the longer term by facilitating faster growth of trees through silvicultural prescription.

Current Condition/Trend	Desired Management Action/Future Condition
<p><u>Late-Seral Connectivity</u> - Past timber harvest on private and public land and pasture creation on private land have reduced connectivity of late seral conifer communities across the landscape. Currently many of the pine community stands offer late-seral conifer connectivity; whereas under historical fire regimes, these communities were likely more open. Precommercial thinning, thinning from below and careful management of reserves and buffers on public land would increase long-term late seral conifer connectivity within conifer communities that provided these habitats in the historical past.</p>	<p><u>Late-Seral Connectivity</u> - Prevent further reduction of late seral connectivity in the short-term. Improve long-term late seral conifer connectivity by facilitating faster growth of trees through silvicultural prescription.</p>
<p><u>Balance of Plant Community Condition</u> - Fire suppression has resulted in a preponderance of dense, high canopy, woody dominated conditions for most plant communities within the project landscape. Past timber harvest has favored immature even-aged stands with simplified canopy structures. Silvicultural prescriptions and prescribed fire would create a more favorable balance of plant community condition for all plant communities in the shorter term. Long-term management would be required to create a balance of conditions reminiscent of recent pre-European historical conditions.</p>	<p><u>Balance of Plant Community Condition</u> - Initiate long-term goal of restoring a more favorable balance of plant community condition across all plant communities. Design and implement a management plan incorporating fire and silviculture to maintain patterns of disturbance best approximating historic community condition defined by stand structure and composition.</p>
Stand-Level	
<p><u>Conifer Density</u> - Fire suppression and past timber management activities have resulted in dense stands of conifers across all conifer plant communities. Historic fire regimes likely kept stands more open than present, resulting in lower densities of larger trees. Silvicultural activities are presently the most important tool for recreating desired tree densities</p>	<p><u>Conifer Density</u> - Density reduction should increase vigor and growth rate of remaining trees to approximate historical conditions for plant communities in the Indian Soda Project Area. See watershed analysis for more detailed discussion.</p>
<p><u>Shade-Intolerant Conifer Abundance</u> - Shade intolerant conifers (e.g. Ponderosa pine) have declined in vigor due to increased competition from more shade-tolerant conifers (e.g. Douglas-fir, white fir.) Present conditions do not allow for shade-intolerant conifer establishment.</p>	<p><u>Shade-Intolerant Conifer Abundance</u> - Apply pine restoration prescriptions to recreate suitable conditions for improving shade-intolerant tree vigor and provide opportunity for seedling establishment and growth. Design management plan to facilitate long-term canopy cover and compositional dynamics thought to occur historically.</p>

Current Condition/Trend	Desired Management Action/Future Condition
<u>Suppressed Herbaceous Understory</u> - Long-term high overstory canopy has suppressed the herbaceous canopy cover and prevented the maintenance of a herbaceous seedbank. Silvicultural prescriptions resulting in lowered tree canopy cover favor the re-establishment of a healthy herbaceous understory, provided weeds do not proliferate.	<u>Suppressed Herbaceous Understory</u> - Restore suppressed herbaceous understory to dominance by promoting vigorous native grasses and forbs. Native seed application may be necessary where native herbaceous component has been lost. Design and implement long-term management plan to maintain herbaceous cover within desired species composition and abundance.
<u>Mistletoe Control</u> - Extensive areas of mistletoe occur throughout the project area. Mistletoe is likely to spread further without silvicultural intervention. Silvicultural prescriptions would reduce the abundance of mistletoe in the project area while maintaining stand-level forest health.	<u>Mistletoe Control</u> - Maintain tree vigor and implement silvicultural prescriptions and patterns of application to limit mistletoe within desired range.
<u>Maintenance of Rare Plant Communities</u> - Springs and seeps surrounded by open meadows define some of the scarcest plant communities on the landscape. These communities have been heavily impacted by livestock. In the current project, two fencing projects would afford protection for some of the most degraded springs and riparian areas within the project area.	<u>Maintenance of Rare Plant Communities</u> - Allow full recovery of all mesic vegetation associated with springs and seeps by excluding and/or fine management of livestock. Manage livestock and use prescribed fire to maintain healthy plant communities within open meadows of the Indian Soda project area.
<u>Spotted Owl Habitat</u> -Critical Habitat Unit (OR-37) contains 3,200 acres of suitable spotted owl nesting habitat within the Indian Soda project area and provides an important connectivity link to owls and other late successional plant and animal species outside of adjoining LSR.	<u>Spotted Owl Habitat</u> - Owl nest cores, 15% Late Successional Reserves, and Riparian Reserves would be maintained to provide spotted owl nesting, roosting, foraging, and dispersal habitat. <i>Maintain overall landscape canopy closure above 40% for spotted owl and other late successional species dispersal.</i>
Hydrology/Fisheries	
<u>Fine Sediments</u> - High road densities, past timber harvest in unstable areas, old roads in poor locations with poor surfacing, inadequate drainage control, and lack of maintenance have caused increased sedimentation in streams.	<u>Fine Sediments</u> - Minimize fine sediment production and delivery to streams.

Current Condition/Trend	Desired Management Action/Future Condition
<u>Water Temperature</u> - Removal of riparian vegetation, sedimentation, water withdrawals, and channel widening has caused many streams to exceed the maximum 7-day average temperature TMDL of 64°F.	<u>Water Temperature</u> - Reduce and maintain summer stream temperatures such that they are within the TMDL limits.
<u>Road Densities</u> - Road densities in much of the Soda Creek watershed are greater than 4.0 miles per square mile.	<u>Road Densities</u> - Maintain all road densities in all drainage areas as low as operationally possible with a target of < 4.0 miles per square mile.
<u>Stream Connectivity</u> - Some culverts limit fish migration or block downstream wood and rock movement.	<u>Stream Connectivity</u> - Properly functioning culverts would be maintained to allow for migration of aquatic organisms.
<u>Large Wood</u> - Management activities have decreased large wood in some stream sections.	<u>Large Wood</u> - >25 pieces/mile; >24 inches in diameter and >50 feet in length (as per the Little Butte Watershed Analysis).
Soils	
<u>Surface Erosion</u> - High road densities, soil compaction, extensive cattle grazing, and timber harvest has increased surface erosion and sedimentation of streams.	<u>Surface Erosion</u> - Minimize surface erosion through improved management actions.
<u>Soil Compaction</u> - High impact logging systems have increased soil compaction, reduced soil productivity, and increased soil erosion.	<u>Soil Compaction</u> - Minimize soil compaction and utilize low impact logging systems.
<u>Mass Wasting</u> - Improper road placement and design, as well as extensive timber harvest in unstable areas, has increased the frequency of mass wasting events.	<u>Mass Wasting</u> - Minimize mass wasting potential, and protect active and potentially active landslides as well as severely eroding areas.
Ecosystem Process/Functioning	

Current Condition/Trend	Desired Management Action/Future Condition
<u>Ecosystem Processes</u> - Timber harvest and livestock grazing have replaced fire as the dominant disturbance processes on the landscape. The pattern of land ownership creates a rigid and uncompromising framework within which these processes occur. Prescribed fire in conjunction with silvicultural prescriptions would help redefine a range of plant communities within their historical bounds. Timber harvest and grazing can only partially reproduce the effects of fire.	<u>Ecosystem Processes</u> - In areas where plant communities are in a condition allowing maintenance; use prescribed fire, timber harvest, and grazing in a manner more consistent with the pattern and effects consequent to historical fire. Where plant communities are not in a condition favoring maintenance, use available management tools to restore suitable condition.

Table 12 summarizes the short and long term cumulative effects for the same ecological and biological criteria at the project, key watershed, and HUC-5 spatial scales. At the project scale, only the effects of the Indian Soda project are estimated. At the Key and HUC-5 spatial scales, the effects of the Indian Soda project are estimated *along with all of the foreseeable future actions, both private and federal.*

Note that a “D” in Table 12 is defined as a “degrade relative to the desired future condition.” This is *not* the same as the “degrade checks” in the Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s) on Relevant Indicators used for NMFS consultation. That is because the “NMFS Checklist” is used to evaluate the effects of a project on T&E fish species only (in this case, coho salmon). Table 12 evaluates the effects of the project on other aquatic animals and habitat. According to the Aquatic Conservation Strategy in the Northwest Forest Plan, a localized short-term degrade is permissible, as long as the 5th field condition is maintained or improved, especially when that short-term degrade is necessary for aquatic and watershed improvement (e.g. road decommissioning). **None of the short-term degrades in the aquatic criteria in Table 12 affect listed fish.**

In general, the short-term degrades in the terrestrial criteria are offset by the long-term improvements in plant community condition.

Table 12. Short and long-term effects of management described by the "proposed action" and "no action" alternatives on landscape, stand-level, wildlife habitat, hydrology/fisheries, soils and ecosystem process criteria at the project, key watershed and HUC-5 spatial extent. Names of the watersheds that equal or approximate the analyzed areas are included in parentheses. Only the Indian-Soda project is evaluated at the project scale. Projects that would occur in the foreseeable future (e.g. Bieber-Wasson, Heppsie, private land clearcuts) are also included in the evaluation at the Key and HUC-5 scales. U = unchanged; I = improvement towards desired future condition; D = degrade relative to desired future condition; + = major change; - = minor change. (considering other projects within larger landscape).

Criteria	Indian Soda Project (Soda Creek)				Key Watershed (So. and No. Forks Little Butte)				HUC 5 (Little Butte Creek)			
	Prop. Action		No Action		Prop. Action		No Action		Prop. Action		No Action	
	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term
Landscape-Level Terrestrial												
Fragmentation	D	I	U	D-	D-	I	U	D-	D-	I	U	D-
Connectivity	D	I	U	D-	D-	I-	U	D-	D-	I-	U	D-
Balance of community condition	I	I-	D	D	I	I	D	D	I	D-	D	D
Stand-Level Plant Community												
Conifer density	I	I-	D-	D	I	I	D-	D	I	I	D-	D
Shade-intolerant conifer maintenance	I	I-	D-	D	I	I	D-	D	I	I	D-	D

Chapter 4
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Indian Soda Project

Criteria	Indian Soda Project (Soda Creek)				Key Watershed (So. and No. Forks Little Butte)				HUC 5 (Little Butte Creek)			
	Prop. Action		No Action		Prop. Action		No Action		Prop. Action		No Action	
	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term
Suppressed herbaceous understory	I	I-	D-	D	I	I	D-	D	I	I	D-	D
Mistletoe control	I	I-	D-	D	I	I	D-	D	I	I	D-	D
Weed invasion	D-	I-	D-	D	D-	D-	D-	D	D-	D-	D-	D
Rare plant community maintenance	I	I	D	D	I	I	D	D	I	I	D	D
Wildlife Habitat												
Amount of suitable and dispersal spotted owl habitat	D+	D	U	U	D	D-	U	U	D-	D-	U	U
Quality of suitable and dispersal spotted owl habitat	D+	I	U	D-	D	I	U	D-	D	I	U	D-
Hydrology/Fisheries												

Chapter 4
Environmental Consequences
Indian Soda Project

Criteria	Indian Soda Project (Soda Creek)				Key Watershed (So. and No. Forks Little Butte)				HUC 5 (Little Butte Creek)			
	Prop. Action		No Action		Prop. Action		No Action		Prop. Action		No Action	
	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term
Sediment	D-	I	U	D	U	I	U	D-	U	U	U	U
Temperature	U	U	U	U	U	U	U	U	U	U	U	U
Riparian vegetation	I-	I	U	I	U	U	U	U	U	U	U	U
Road density	I-	I-	U	U	U	U	U	U	U	U	U	U
Peak flows	U	U	U	U	U	U	U	U	U	U	U	U
Fish connectivity	I	I	U	U	I	I	U	U	U	U	U	U
Large wood	U	I	U	I-	U	U	U	U	U	U	U	U
Soils												
Surface erosion	D-	I-	D	D	D-	U	D-	D-	U	U	U	U
Compaction	U	U	U	U	U	U	U	U	U	U	U	U
Mass wasting	D-	U	U	U	U	U	U	U	U	U	U	U
Ecosystem Process/Function												
Fire reintroduction	I	I	U	U	I	I-	U	U	I	I-	U	U

2. Future Forseeable Actions

The Ashland Resource Area is planning four projects in the Little Butte Watershed for the next decade (Table 13). All are in the Key watershed with the exception of Antelope Project, which is located in the Antelope Creek watershed. The Butte Falls Resource Area in the BLM Medford District is planning to implement the Bieber Wasson project which is partially located in the North Fork of the Little Butte Creek watershed (Table 13).

Table 13: Upcoming BLM projects in the Little Butte Watershed and the South/North Fork Key Watershed.

Project Name	Acres Projected to be Treated ¹	Within Key Watershed	All or partially within HUC-5	Projected Sale Date ²
Bieber Wasson	1700 (actual)	Yes	Partially	2000
Conde Shell	2727 (estimate)	Yes	All	2001
Deer Lake	2729 (estimate)	Yes	All	2002
Heppsie	1143 (estimate)	Yes	All	2004
Antelope	3137 (estimate)	No	All	2006

1 - Acres are those available for treatment after subtracting known owl cores, ACEC's and other reserves. Actual acreage are those acres that are proposed for treatment in an EA. Estimated acreage are for projects that have not yet been planned.

2 - Projected sale dates may change. Also note that the project activities may take place anytime within 5 years after the sale date.

The Bieber Wasson project is planned and proposed in a level as detailed as the Indian Soda Project. Proposed project activities include several different kinds of forest management, culvert removal, road decommissioning, road closure and riparian fencing (Tables 14 and 15). Details are included in the Bieber Wasson project EA (#OR-110-99-15).

Table 14: Comparison of road work and riparian fence construction proposed in Indian Soda and Bieber Wasson projects within the Little Butte Creek watershed.

Type of Activity	Indian Soda	Bieber Wasson	Total Both Projects
Road decommissioning (mi.)	5	3.5	8.5
New road construction (mi.)	1	0	1.1
New permanent road closures (mi.)	23	2.9	25.9
New seasonal road closures (mi.)	0	8.8	8.8
Riparian fencing	½ acre	200'	na
Springs fenced (number)	2	1	3

Table 15: General types of silvicultural prescriptions in the Indian Soda and Bieber Wasson projects and the percent of

area of the North and South Forks Key Watershed and Little Butte Creek HUC-5 Watershed that these prescriptions cover. The Key Watershed = 86,776 acres; the HUC-5 Watershed = 238,598 acres. All numbers are in acres unless otherwise noted.

Type of Prescription	Indian Soda	% Key	% HUC-5	Bieber Wasson	% Key	% HUC-5	Total Both Projects	% Key	% HUC-5
Density Mngmt. Select Cut	1775	2.0	0.7	1094	1.3	0.5	2869	3.3	1.2
Regeneration Shelterwood Mortality	0	0	0	606	0.7	0.3	606	0.7	0.3
TOTAL	1775			1700			3475	4.0%	1.5%

In the Bieber Wasson project, 1700 acres of forest are proposed for some kind of harvest (Table 15). Of this, 606 acres are regeneration, shelterwood, or “mortality” prescriptions, all of which reduce canopy closure below 40%. Combined with 1094 acres of density management in the

Bieber Wasson project and 1775 acres of density management (“thinning from below” with small openings of approximately ½ acre) in the Indian Soda Project, the total acreage impacted by these two projects is still only 4.0% of the Key watershed and 1.5% of the HUC-5 watershed (Table 15). Therefore, it is unlikely that the effects of these projects, both positive or negative, could be noticed at the larger spatial scales of the Key and HUC-5 watersheds. When the proposed treated acres for all of the foreseeable future projects are combined, treatments are planned on 11.6% of the Key watershed--5.0 % of the HUC-5.

However, 50% of the land in the Little Butte Creek watershed is in private ownership. Of this, 42% is owned by timber companies. If we assume that the private forest lands would be clearcut in the foreseeable future, then adding the proposed BLM projects would increase the forested area impacted in the watershed to approximately 47%. The estimated cumulative effects of the future foreseeable actions are broken down further in Table 12.

C. CRITICAL ELEMENTS

The following elements of the human environment are subject to requirements specified in statute, regulation, or executive order and must be considered in all EA’s.

Table 12: Critical Elements

Critical Element	Affected		Critical Element	Affected	
	Yes	No		Yes	No
Air Quality		✓ **	T & E Species		✓ *
ACECs		✓ *	Wastes, Hazardous/Solid		✓
Cultural Resources		✓ *	Water Quality		✓ **
Farmlands, Prime/Unique		✓	Wetlands/Riparian Zones		✓ **
Floodplains		✓	Wild & Scenic Rivers		✓

Critical Element	Affected		Critical Element	Affected	
	Yes	No		Yes	No
Nat. Amer. Rel. Concerns		✓	Wilderness		✓
Invasive, Nonnative Species		✓**	Environmental Justice		✓

*These affected critical elements could be impacted by the implementing the proposed action. Impacts are being avoided by project design.

**These affected critical elements would be impacted by implementing the proposed action. The impacts are being reduced by designing the proposed action with Best Management Practices, Management Action/Direction, Standard and Guidelines as outlined in the Environmental Impact Statements (EIS)/Record of Decisions (*RMP*) (*USDI BLM 1995*)(*USDA FS; USDI BLM 1994*) tiered to in Chapter 1. The impacts are not affected beyond those already analyzed by the above mentioned documents.

CHAPTER 5

List of Agencies and Persons Consulted

SUMMARY OF PUBLIC INVOLVEMENT

During the scoping period, a letter explaining the project and requesting issue/concern identification was mailed (October 13, 1998) to the Little Butte Creek Watershed Analysis mailing list and other interested parties. Also, an additional letter was mailed (February 24, 1999) inviting interested individuals to attend a public tour (March 2, 1999) of BLM lands to look at proposed forest practices in the Little Butte Creek area and to discuss known issues. Upon completion of this EA, a legal notification was placed in the Medford Mail Tribune offering a 30-day public review and comment period. For additional information, please contact Bill Yocum or Lorie List at (541)618-2384.

DISTRIBUTION LIST AND AVAILABILITY ON THE INTERNET

This EA was distributed to individuals on the BLM updated mailing list from the scoping process. It was also sent to the following agencies and organizations.

Little Butte Watershed Council
Jackson Soil & Water Conservation Dist.
Jackson Co. Stockmen's Assoc.
Audubon Society
Klamath Siskiyou Wildlands Center
Headwaters
Friends of the Greensprings
Oregon Natural Resource Council
The Pacific Rivers Council
Rogue Group of Sierra Club
Association of O&C Counties
Oregon Department of Fish and Wildlife
Oregon Department Forestry
Southern Oregon Timber Industry Assoc.
Southern Oregon University
Jackson Co. Commissioners
Rogue River National Forest

TRIBES

The Confederated Tribes
Cow Creek Band of Umpqua Indians
Confederated Tribes of Grand Ronde
Confederated Tribes of Siletz
Klamath Tribe
Quartz Valley Indian Reservation (Shasta Tribe)
Shasta Nation
Confederated Bands [Shasta]
Shasta Upper Klamath Indians

Confederated Tribes of the Rogue-table Rock and Associated Tribes

AGENCIES CONSULTED

A. Federal Agencies

U.S. Fish and Wildlife Service
U.S. National Marine Fisheries Service

B. State and Local Agencies

Oregon Department of Fish And Wildlife

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- U.S. Department of Agriculture, Forest Service and U.S. Department of the Interior, Bureau of Land Management. 1994. *Record of Decision (ROD) for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and the Standards and Guidelines for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl*. Portland, OR.

APPENDICES

APPENDIX A: PROPOSED ACTIVITIES IN HARVEST UNITS

Table A-1: Proposed silvicultural prescriptions, yarding systems, fuel treatments and volume for each harvest unit in the Indian Soda Project Area (Map of unit location available by request (541)618-2384.

UNIT #	UNIT ACRES	SILVIC. METHOD 1/	YARDING SYSTEM 2/	FUELS MGT 3/	ESTIMATED VOLUME CUT/ACRE (range) (MBF)
1	71	I/S/GS	CR/PS/H	HP/UB/SI	12-20
2	140	I/S/GS	CR/PS/H	HP/UB/SI	10-20
3	39	I/S/GS	PS	HP/UB/SI	10-20
4	25	I/S/GS	PS	HP/UB/SI	6-10
5	110	I/S/GS	CR/PS/H	HP/UB/SI	6-20
6	37	I/S/GS	CR/PS	HP/UB/SI	10-15
7	3	I/S/GS	CR	HP/UB/SI	12-20
8	17	I/S/GS	PS/H	HP/UB/SI	12-20
9	241	I/S/GS	CR/PS/H	HP/UB/SI	10-20
10	11	I/S/GS	CR	HP/UB/SI	12-20
11	2	I/S/GS	CR	HP/UB/SI	12-20
12	4	I/S/GS	PS/H	HP/UB/SI	12-20
13	19	I/S/GS	PS/H	HP/UB/SI	12-20
14	110	I/S/GS	CR/PS/H	HP/UB/SI	6-20
15	180	I/S/GS	CR/PS/H	HP/UB/SI	12-20
16	70	I/S/GS	CR/PS	HP/UB/SI	12-20
18	8	I/S/GS	CR	HP/UB/SI	6-10
19	22	I/S/GS	CR	HP/UB/SI	6-10
20	16	I/S/GS	CR	HP/UB/SI	6-10
21	24	I/S/GS	PS	HP/UB/SI	12-20
22	5	I/S/GS	CR/PS	HP/UB/SI	12-20
23	26	I/S/GS	CR/PS	HP/UB/SI	12-20
24	22	I/S/GS	PS	HP/UB/SI	12-20
25	30	I/S/GS	CR/PS	HP/UB/SI	12-20
26	12	I/S/GS	CR	HP/UB/SL	12-20
27	8	I/S/GS	PS/H	HP/UB/SL	6-10
28	10	I/S/GS	PS	HP/UB/SL	12-20

UNIT #	UNIT ACRES	SILVIC. METHOD 1/	YARDING SYSTEM 2/	FUELS MGT 3/	ESTIMATED VOLUME CUT/ACRE (range) (MBF)
29	10	I/S/GS	PS/H	HP/UB/SL	12-20
30	77	I/S/GS	CR/PS/H	HP/UB/SL	12-20
31	2	I/S/GS	H	HP/UB/SL	12-20
32	88	I/S/GS	CR/H	HP/UB/SL	10-15
34	13	I/S/GS	PS	HP/UB/SL	12-20
35	48	I/S/GS	H	HP/UB/SL	12-20
36	2	I/S/GS	H	HP/UB/SL	6-10
37	23	I/S/GS	CR/PS	HP/UB/SL	6-10
38	2	I/S/GS	PS	HP/UB/SL	12-20
39	11	I/S/GS	H	HP/UB/SL	12-20
40	7	I/S/GS	H	HP/UB/SL	10-15
41	207	I/S/GS	CR/PS/H	HP/UB/SL	12-20
42	6	I/S/GS	H	HP/UB/SL	10-15
43	4	I/S/GS	H	HP/UB/SL	10-15
44	40	I/S/GS	H	HP/UB/SL	12-20
45	18	I/S/GS	H	HP/UB/SL	6-10

1/ Silvicultural Methods I=Intermediate Treatment (Commercial Thinning)

S=Selection Harvest GS=Group Selection

2/Yarding Systems CR=Crawler PS=Cable H=Helicopter

3/Fuels Management HP=Handpile, cover and burn UB=Underburn SL=Slashing

APPENDIX B: PROPOSED ROADWORK

Table B-1: Indian Soda Road Summary.

Road Number	Approx. Mileage	Surface Type	Control	Depth	Poss. Impr / comment	Seasonal Restriction *log haul
37-2E-13(A1)	0.86	ASC	PB	4	-	1
37-2E-36.4	0.20	NAT	BL	-	4" ASB	1
37-3E-18.1A	1.02	ASC	BL	6	4" ASC	2
37-3E-18.1B	0.95	ABC	BL	6	4" ASC	2
37-3E-18.2	0.15	ABC	BL	8	Barricade	1
37-3E-18.3	0.60	SRN	BL	6	-	1
37-3E-18.4A	0.58	ABC	BL	8	-	2
37-3E-18.4B	0.01	NAT	BL	-	8" ABC	2
37-3E-18.5	0.10	NAT	BL	-	Decommission	1
37-3E-18.6	0.26	ABC	BL	8	Barricade	2
37-3E-18.7	0.17	ABC	BL	8	-	2
37-3E-19	3.53	ABC	BL	8	Decommission middle 0.4 miles Barricade last 0.5 miles	2
37-3E-19.1A	1.11	ASC	BL	6	4"ASC	2
37-3E-19.1B	0.87	ABC	BL	8	4" ASC	2
37-3E-19.2	0.35	NAT	BL	-	Decommission	1
37-3E-19.3	0.50	NAT	PV	-	Decommission	1
37-3E-19.4	0.18	ABC	BL	8	Barricade	2
37-3E-19.5	0.31	ABC	BL	8	Barricade	2
37-3E-19.6	0.35	NAT	BL	-	4" ABC	1
37-3E-20.1	0.13	ABC	BL	8	Barricade	2
37-3E-21	0.51	NAT	BL	-	10"/ gate	2
37-3E-28A1/A3	0.79	ASC	OB	4	6" ASC/Gate	2
37-3E-28A2	0.10	ASC	PB	4	6" ASC	2
37-3E-28 (B-D)	0.92	ASC	BL	4	6" ASC	2
37-3E-28.1	1.04	ASC	BL	4	6" ASC	2
37-3E-29	0.48	ABC	BL	8	Barricade	2
37-3E-29.1A	0.55	NAT	BL	-	8" ABC	2

Road Number	Approx. Mileage	Surface Type	Control	Depth	Poss. Impr / comment	Seasonal Restriction *log haul
37-3E-29.1B	0.10	PRR	BP	6	4" ABC	2
37-3E-29.2	0.40	ASC	BL	6	Barricade	2
37-3E-29.3	0.18	ABC	BL	8	-	2
37-3E-29.4	0.12	GRR	BL	6	Decommission	1
37-3E-29.5	0.12	NAT	BL	-	Decommission	1
37-3E-30	0.50	ABC	BL	12	Barricade	2
37-3E-30.4	0.50	ABC	BL	8	-	2
37-3E-30.5	0.16	ABC	BL	8	Barricade	2
37-3E-30.6	0.54	ABC	BL	8	Barricade	2
37-3E-31A	1.68	PRR	BL	8	-	2
37-3E-31B	0.41	ASC	BL	4	4" ASC	2
37-3E-31.1	1.28	PRR	BL	6	Gate/Barricade	1
37-3E-31.2	0.20	PRR	BL	6	Decommission	1
37-3E-31.3	0.60	PRR	BL	6	-	1
37-3E-31.5	0.11	PRR	BL	6	Decommission	1
37-3E-32A1	0.29	ASC	BL	4	4" ASC	2
37-3E-32A2	0.96	PRR	BL	8	-	2
37-3E-32B	1.35	PRR	BL	6	4" ASC	2
37-3E-32.1	0.15	NAT	BL	-	-	1
37-3E-32.2	0.25	ASC	BL	4	4" ASC	2
37-3E-32.3	0.44	PRR	BL	6	Gate	1
37-3E-32.4	0.35	PRR	BL	6	-	1
37-3E-32.5	0.75	NAT	BL	-	Decommission	1
38-2E-11	5.19	ASC	BL	4	4" ASC	2
38-2E-11K	0.44	PRR	BL	6	4" ASC	2
38-2E-27C3	1.15	BST	BL	4	4"ASC/BST	0
38-2E-27D1	1.50	BST	BL	6	4"ASC/BST	0
38-2E-27D2	1.23	BST	BL	6	4" ASC/BST	0
38-2E-27D3	0.47	BST	BL	6	4"ASC/BST	0
38-3E-4.1	2.47	ASC	BL	6	Gate	1
38-3E-4.2	0.73	ABC	BL	6	-	1

Road Number	Approx. Mileage	Surface Type	Control	Depth	Poss. Impr / comment	Seasonal Restriction *log haul
38-3E-5	1.49	ASC	BL	4	4" ASC/Gate	2
38-3E-5.1	0.91	ASC	BL	4	Gate	1
38-3E-5.2	0.15	ASC	BL	4	-	1
38-3E-5.3	0.13	NAT	BL	-	-	1
38-3E-6	0.50	NAT	BL	-	Barricade	1
38-3E-6.1	0.40	NAT	BL	-	Decommission	1
38-3E-6.2	0.70	NAT	BL	-	Decommission	1
38-3E-6.3	0.25	NAT	BL	-	Decommission	1
38-3E-9	1.57	ASC	BL	6	4" ASC	2
38-3E-17(A-C2)	5.34	BST	BL	8	-	0
38-3E-17(D-F)	6.00	BST	BL	8	-	0
Jeep Rd-Sec 18	0.75	NAT	BL	-	Decommission	-
Jeep Rd-Sec 30	0.12	NAT	BL	-	Decommission	-
Total Mileage:	58.69					

Control Key: BL = Bureau of Land Management PB = Pvt./BLM Imp PV = Private
OB= Other/BLM Imp

Surface Type Key: NAT = Natural ASC = Agg. Surf. Course
ABC = Bitumin. Surf. Treatment PRR = Pit Run Rock
GRR = Grid Rolled

Seasonal Restriction: 0= None 1= 10/15 - 6/15 2= 11/15 -5/15
3= 3/1 - 9/30 Wildlife

Types of Decommission are:

1. Natural Decommission - Section of the roads would be allowed to decommission naturally but may include selective ripping, removal of drainage structures, constructing water bars, and barricades.
2. Mechanical Decommission - Roads would be decommissioned mechanically and may include ripping, removing drainage structures, seeding and /or planting, constructing water bars and barricades. = Agg. Base Course
BST

Table B-2: New Construction. ASC = Aggregate Surface Course

Road Number	Approx. Mileage	Surface Type	Control	Depth	Poss. Impr / comment	Seasonal Restriction *log haul
37-2E-24.4	0.9	ASC	BLM	8"C	Gate	2
Total Mileage:	0.9					

APPENDIX C: CUMULATIVE ANALYSIS

Vegetation (Forestry)

With no forest stand density reduction, slow tree growth and vigor would result in individual tree and perhaps stand mortality. If severe stand mortality results, silvicultural options in the future would be reduced. It is possible that after bark beetle attack and Douglas-fir dwarf mistletoe mortality, there may be less than 16 trees per acre remaining in some forest stands. If this happens we would not be able to harvest timber for approximately 30 to 50 years.

Pine species would continue to decrease in number if large openings are not created for these shade intolerant species. The more shade tolerant white fir and Douglas-fir would continue to dominate the forest.

Where dense forest stands persist over time, canopy closure would remain at 90 to 100 percent. When tree mortality is singular or in small patches, canopy closure would be approximately 50 to 80 percent. Where large patches of trees die, canopy closure would be 0 to 40 percent.

Fire hazard would increase with the abundance of dead vegetation and ladder fuels.

There is a wide variety of silvicultural prescriptions because of the wide variety of present day forest stand structure. A variety of prescriptions are needed to create future old-growth forest stand structure. Approximately 380 acres of moist Douglas-fir, 361 acres of mixed conifer forest, 330 acres of pine series and dry Douglas-fir forest, and 704 acres of forest infected with dwarf mistletoe are being treated by the prescriptions. Canopy closure would be more variable after treatment. On Douglas-fir and mixed conifer sites canopy closure would range from 25 (in small patches) to 50 percent (in larger homogeneous patches). On pine sites canopy closure would range from 20 to 40 percent in a similar pattern. Average weighted canopy closure for the Indian Soda project would be approximately 38 percent .

Canopy closure calculations by prescription type for the Indian Soda Project.

Prescription Type	Unit#	Unit Acres	% of Project Area	Resulting Canopy Closure¹
Moist Douglas-fir	5	110		50
	27	8		50
	43	4		50
Total Acres/Weighted Closure		122	7	50
Mixed Conifer	4	25		40
	18	8		50
	19	22		50
	20	16		50
Total Acres/Weighted Closure		71	4	46
Dry Douglas-fir	31	2		45
	36	2		45
Total Acres/Weighted Closure		4	1	45
Pine Rx's	2	140		40
	6	37		20

Prescription Type	Unit#	Unit Acres	% of Project Area	Resulting Canopy Closure¹
	7	3		45
	32	88		40
	40	7		40
	42	6		35
Total Acres/Weighted Closure		281	16	37
Mistletoe	1	71		30
	3	39		25
	10	11		33
	11	2		45
	12	4		40
	13	19		40
Mistletoe	21	24		35
	26	12		40
	28	10		40
	29	10		40
	30	77		40
	34	13		40
	38	2		40
Total Acres/Weighted Closure		294	16	35
Mixture of Rx's				
Moist DF/Mistletoe	8	17		45
Moist DF/Mistle/Pine	9	241		33
Mixed Conifer/Mistle/Pine	14	110		40
“	15	180		33
Mistletoe/Pine	16	70		33
“	22	5		35
“	23	26		45
Dry DF/Pine	24	22		45
Mistletoe/Pine	25	30		40
“	35	48		40

Prescription Type	Unit#	Unit Acres	% of Project Area	Resulting Canopy Closure¹
Dry DF/Pine	37	23		40
Mistletoe/Pine	39	11		40
Moist DF/Mistle/Pine/Dry DF	41	207		40
Moist DF/Mistletoe	44	35		45
Total Acres/Weighted Closure		1003	56	37
GRAND TOTAL ACRES		2028		

By applying various landscape prescriptions, future silvicultural options would be increased. In the majority of forest stands that would be commercially thinned, commercial thinning could occur again, or regeneration harvest could occur in 10 to 40 years. Pole sized stands could be entered in approximately 40 years. The prescriptions would also assume that drought resistant conifer species such as ponderosa pine and incense cedar would be present in future stands where appropriate in regard to site conditions.

If surrounding private lands are clearcut, our forest stands would be the only patches of forest left to provide late-successional habitat. Surrounding BLM lands would be managed with prescriptions to improve late-successional habitat. This would assure that forest stands are healthier on a larger land scale. Forest canopy closures would be in the range of natural variability but sometimes below canopy closures recommended for full hydrologic recovery in the transient snow zone. These small areas (less than 1-acre) of open canopy closure would grow to full hydrologic recovery as specified in the watershed analysis in approximately 10 to 30 years. Treating the forest stands would promote forest stand connectivity with late-successional characteristics for the future.

Special Status Plants

Timber harvest, fire suppression, and rural development have had the greatest effect on Special Status and S&M plant species in the Little Butte Creek Watershed. Rural development has caused the most permanent changes to the natural plant communities. Timber harvest and fire suppression cause changes to plant community structure and composition.

Past actions in the watershed have undoubtedly affected undiscovered Special Status and S&M plant sites and their habitats. On federal land, Special Status plant list revisions and the development of the S&M list protects species without previous management requirements. While some populations may have been adversely affected or lost, species viability is maintained by other managed sites and the establishment of late successional reserves.

Current and future timber harvest would further serve to fragment suitable habitat for many Special Status and S&M plant species. Fuels treatments would cause short term adverse effects from habitat disturbance. Unoccupied suitable habitat and undiscovered sites would be lost. Long term effects from the mostly thinning operations and the reintroduction of fire would be beneficial.

Wildlife

Past actions that have had the greatest influence on existing wildlife/wildlife habitat conditions in the area are timber harvest on federal and private lands, fire suppression, and residential development (Little Butte Creek Watershed Analysis, 1997). Past timber management practices were usually to clearcut forest stands. This resulted in fragmentation of the forest landscape and loss of habitat for forest dependent species. Fire exclusion has a negative effects on the overall health of forest stands. The exclusion of fire caused a trend toward the loss of some habitat types such as grassy meadows, open pine stands, and oak woodlands. Grazing practices have caused a decline in grassland habitat health.

In 1994, the Northwest Forest Plan established a Late Successional Reserve (LSR) of 52,980 acres in the Little Butte

Creek watershed to preserve late successional forest habitat for wildlife species dependent on this type of habitat such as the spotted owl. This large preserve has had a positive effect on overall wildlife habitat conditions and connectivity between late successional forest stands in the Little Butte Creek watershed.

The cumulative effects of these projects include the short-term loss of canopy closure in forest stands. The long-term effect of thinning and the reintroduction of fire is to move the forest landscape toward larger trees and healthier forests. There would be a loss of snags, which would have detrimental effects on cavity nesters such as woodpecker species. Pine, regeneration, or mistletoe prescriptions may result in canopy closure less than 40 percent, which is too open for spotted owl dispersal and would have detrimental effects to some other species of wildlife.

Scattered parcels of private land immediately surrounding the Indian Soda project are currently owned by private logging companies. A much larger percentage of private lands surrounds the northern portion of the watershed north of Highway 140 around BLM (Butte Falls Resource Area) lands and is owned by several different private timber companies.

The Indian Soda project area is part of the Little Butte Creek 5th field watershed. The Northwest Forest Plan and subsequent direction call for an analysis of late successional habitat to be performed at the 5th field watershed scale. Also, late successional areas are to be identified for retention in watersheds where late successional habitat is relatively scarce, or is expected to become scarce in the future.

The BLM analysis of late successional habitat in this watershed was performed for the third year review of the NWFP. This analysis resulted in the following conclusion:

“Based on the data presented, this watershed currently meets the 15% S&G. The current BLM reserves contain 10,589 acres of late successional habitat, or 34.1 % of the BLM forest lands. A full harvest scenario on BLM lands would modify 8,255 acres of late seral vegetation over a 10 year time period.”

The analysis indicates that the 5th field watershed will continue to meet the 15% retention S&G after harvest of the planned timber sales in the Little Butte planning area. The federal lands in the watershed are mostly USFS (75%) with the remainder being BLM. There is a large Late Successional Reserve on the USFS portion of the watershed which provides a significant portion of the late successional habitat in the watershed. Other reserves dispersed throughout the Matrix and contributing late successional habitat towards the 15% S+G are spotted owl core areas, Great grey owl protection buffers, and some riparian reserves. Late successional stands that occur in existing reserves in the Little Butte planning area are well distributed within the planned harvest areas.

Hydrology/Soils/Riparian/Fisheries

AQUATIC CONSERVATION STRATEGY OBJECTIVES

1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

Project-level: **The hydrology and fisheries team defined “project level” as encompassing the land within the project boundaries, essentially the Soda Creek watershed. At the project level, the primary treatment objective is to restore landscape-level processes and condition. Although the response (of the vegetation for example) to the projects won’t be immediate, over the long term silvicultural thinning, plantation recovery, fire reintroduction and sediment source reduction should improve nutrient cycling, groundwater flow, riparian vegetation connectivity, large woody debris routing and many other spatially and/or temporally large features and processes.**

Key Watershed Level: There would be some improvement to the aquatic systems at this level, mostly from reintroducing fire and improving the overall landscape functioning.

HUC-5 Level: Effects of this project may well be swamped by the large spatial scale of the Little Butte Creek watershed. Any improvements would be minor.

2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral,

longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

Project level: There would be immediate improvements in connectivity for fish and streams when 5 perched culverts are removed or replaced with larger ones. Over the long-term, floodplain connectivity and riparian reserve connectivity should be restored through, for example, road decommissioning. The filtering capacity and condition of two springs would be improved with fencing, thereby slowly improving their connection to the aquatic system at both macro- and micro-levels.

Key Watershed level: There would be some small improvement at the Key Watershed scale, simply due to restored drainage networks in Soda Creek.

HUC-5 level: The effects of the actions in Soda Creek would likely be swamped by actions on private land throughout the HUC-5, and also just due to the HUC-5's large spatial scale.

3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

Project level: Long term increases in large woody material would help reestablish channel structure. Fencing projects along Soda Creek and around springs would protect banks from hoof shear and other grazing-associated damage. Culvert repair would decrease bank scour at some locations.

Key Watershed level: No effect at this large spatial scale.

HUC-5 level: No effect at this large spatial scale.

4. Maintain and restore water quality necessary to support healthy riparian, aquatic and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

Project level: The cumulative effects of many small-scale improvements in riparian vegetation (e.g. in fenced meadows, plantations, etc.) *may* slightly decrease water temperatures over time. However, the reasons water temperatures in Soda Creek are above 64F are unknown (monitoring is underway), so it is impossible to predict whether recovering vegetation would make a measurable difference in water temperature. Also see ACS Objective #5.

Key Watershed level: No effect at this large spatial scale.

HUC-5 level: No effect at this large spatial scale.

5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

Project level: Road improvements, culvert replacements and decommissioning may create short-term increases in fine sediment production, but not at a level that would affect listed fish. Ultimately, road-related fine sediment input would be reduced, improving habitat for resident fish. Closing and gating roads in the winter would prevent vehicles from rutting dirt roads and accelerating soil erosion. Fencing meadow and spring areas would help riparian vegetation recover, strengthening root networks in fragile meadow soils. Buffering slumps when marking timber would reduce sudden soil movement during saturated soil conditions. (Although the Soda Creek watershed has historically experienced slumps and slides due to its naturally unstable soils, protecting slumpy areas would ensure that sediment input is not aggravated by management actions.)

Key Watershed level: Some improvement, mostly by reducing fine sediment input during high water events.

HUC-5 level: No effect at this large spatial scale.

6. Maintain and restore instream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

Project-level: Silvicultural thinning may cause a slight increase in peak flows due to the more open canopy and

increased soil compaction. However, road decommissioning and improvements should reduce concentrated flow off roads, which would decrease peak flow levels. There would be some increase in the risk of a high flow event (rain-on-snow) within the next 5-15 years; but in the long term, the risk disappears as the canopy recovers. Low flows should remain the same. None of the flow changes would be significant enough to affect listed fish.

Key Watershed level: No effect due to the large spatial scale.

HUC-5 Level: No effect due to the large spatial scale.

7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

Project level: No change. The small amount of fencing in the upper meadow areas of Soda Creek is not sufficient to affect floodplain inundation or water elevation.

Key Watershed level: No effect due to the large spatial scale.

HUC-5 level: No effect at this large spatial scale.

8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

Project level: Riparian Reserve plant communities would improve in PCT'd areas. Trees should attain late-successional characteristics sooner, and in some treatment areas, vegetation would become more structurally diverse. Fencing a short section of Soda Creek and two springs in a grazing allotment would relieve riparian vegetation from grazing impacts at those sites.

Key Watershed: No effect at this large spatial scale.

HUC-5 Level: No effect at this large spatial scale.

9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

Project level: In the short term, mollusk buffers, owl cores and untreated Riparian Reserves would maintain habitat for terrestrial riparian species. In the long term, PCT (only done to improve habitat) should improve areas of poor quality for terrestrial riparian species and increase large wood recruitment to channels.

Consequently, habitat for both aquatic and terrestrial species should improve. In addition, removing 5 fish-blocking culverts would restore access to approximately 2 ½ miles of resident fish habitat.

Key Watershed: Minor improvements at this large spatial scale, depending on the species concerned and the spatial and temporal scales at which they operate. Otherwise, no effect.

HUC-5 Level: No effect at this large spatial scale.

1. Conopy Cover calculation does not account for any reserves dealing with Survey & Manage reserves.